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COMPUTERWORLD

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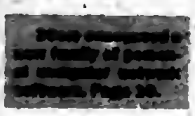
IBM users confused by net reversal

By John Dix

IBM's policy reversal in conceding that twisted-pair telephone wiring is adequate for data transmission has surprised and confused a sampling of users interviewed by *Computerworld*. These users have installed or are planning to install IBM's Cabling System with more expensive shielded wire.



The mainframe maker has told users, since the introduction of the building wiring scheme in May 1984, that it was necessary to use a shielded-type wire to support data devices and future IBM local-network products.

"IBM kept telling us we had to go with shielded wire if we were going to use the IBM local network," said Greg Burns, senior communications administrator with Bergen Brunswig, a Carson, Calif.-based medical and surgical supply distributor.

That is no longer true. IBM announced a new type of nonshielded cable for the Cabling System three weeks ago with the introduction of its Token-Ring network. This standard twisted-pair wire can be used for the new local network or for the support of data devices.

The Cabling System is a building wiring scheme that specifies how and with what a building can be cabled to provide outlets like electrical sockets for data devices. Use of the system obviates the need to pull new wires every time peripherals are moved.

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'Get tough,' DPers urged

By James Connolly

HOUSTON — The president of a major mainframe software company has taken his campaign for applications standards to the general user community.

"Ask the tough questions," urged Software International Corp. President Jeffrey S. Goodman, encouraging DP managers to be demanding in dealing with companies such as his own. "The chasm has never been wider" between what users need and what vendors provide, Goodman told members of the Data Processing Management Association last week.

In recent months, Goodman has prodded vendors to adopt such standards. Last week's appearance, at the annual DPMA

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TOP OF THE NEWS

Ask Computer Systems, Inc. this week will introduce versions of its Manman manufacturing information software for Digital Equipment's Microvax II. The software was previously available only on Hewlett-Packard's HP 3000 series. A Manman/Microvax II turnkey system with four terminals will be priced at $149,000.

■

Convergent Technologies suffered a mass exodus of top management last week as founder and Chairman Allen H. Michels resigned to form a new company, taking four top officers with him. Although Michels told Convergent that the new venture will not be a direct competitor, the episode raises the po-

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Apple push on for more system links

Improved Mac, IBM, DEC compatibility is targeted

By James A. Martin

IRVING, Texas — Apple Computer, Inc. will focus on networking solutions to address compatibility problems between its Macintosh and IBM's mainframes and Digital Equipment Corp.'s VAX system, according to company President John Sculley.

Speaking to a gathering of computer dealers sponsored by the Businessland, Inc. retail chain, Sculley briefly outlined several Apple networking projects that included systems to incorporate IBM Systems Network Architecture networking capabilities and support for LU6.2, Document Interchange Architecture and Document Content Architecture. These systems will "not penalize the user with slower response time or other limitations" and will "provide not only terminal emulation or [personal computer-like] functions but also access to complete office systems and distributed data processing functionality," Sculley said.

These efforts are aimed at giving the Macintosh a more competitive position in an office automation marketplace where IBM is the standard. Sculley said the Macintosh has "not yet been broadly accepted by business" because most end users initially preferred the computing power available from Microsoft Corp. MS-DOS processors over the Macintosh's "ease-of-

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CW EXCLUSIVE

On the job: Hartford's blueprint for a DP hire

By Paul Korzeniowski

HARTFORD, Conn. — When Frank Shaw looks at his to-do list this morning, it will be radically different from last Friday's. Locating the nearest coffee machine and unpacking his belongings will top this week's list as Shaw begins his first day as director of data processing for the city of Hartford.

Shaw comes to his new office, housed in a brick building on a quiet street on the outskirts of downtown Hartford, after serving as DP manager at Rhode Island Hospital in Providence, R.I.

The hunt for Shaw, which took only two months, could serve as a model of efficiency for other municipalities or corporations.

The search started on a sour note. Last winter, when the city decided to replace its Burroughs Corp. 6930 mainframes (see story page 6), it did not anticipate replacing its director of data processing as well. But that is what happened. In May, the former director decided to retire rather than oversee a conversion to another system. "She had talked about retirement, but we had expected her to remain here for at least one more year," noted Lee Erdmann, an assistant city manager who oversaw the hiring of Shaw.

Hartford's Shaw

A temporary director was appointed because the city did not want to hire a director of data processing before awarding a new hardware contract. In June, the city signed a contract with IBM for a 4381 Model 1, and in July a search for someone to manage the conversion and the 55-person DP staff began.

The hunt stretched far and wide as advertisements were placed in *The Boston Globe*, *Computerworld*, *The Wall Street Journal* and a number of local newspapers. Approximately 160 DP professionals answered Hartford's call for someone to oversee the operation at a salary between $35,000 and $50,000.

Erdmann, Mike Brown — another assistant city manager — and Wheeler Smith, the executive director for the Citizens Committee for More Efficient Government, sifted through the applications in search of the right candidate. That person would have managed at least a few major projects; be very familiar with IBM's offerings, especially the 4300 line, and would have

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NEWSPAPER

CDC loses big; DG has slim gain

CDC seeking loan extensions from creditor banks

By Clinton Wilder

In results even worse than a pessimistic financial community had expected, Control Data Corp. last week reported a third-quarter loss of $255.6 million, or $6.65 per share, on revenue that remained essentially flat from the year-earlier quarter.

Separately, Data General Corp. posted a meager $600,000 fourth-quarter profit on revenue that declined 12.5% from the year-earlier quarter to $299.5 million. The Westboro, Mass., minicomputer maker said its business did not pick up from its losing third quarter ended in June, but it returned to the black as a result of reduced employment levels and other cost cuts.

Putting the 1985 computer slump in sharp perspective, DG's earnings for the fiscal year ended Sept. 28 were $24.3 million, or 92 cents per share — exactly the same as in its fourth quarter in 1984. In fiscal year 1984, DG earned a record $83.3 million, or $2.60 per share, including a one-time tax gain of $3.6 million. Fiscal-year revenue edged up 6.7% from $1.16 billion in 1984 to $1.24 billion.

DG spokesman Ken Donoghue said the company earned a profit in the fourth quarter only because of cost savings resulting from the layoff of some 1,400 workers and from other retrenchment measures taken last June.

"Our employment levels are now more consistent with the level of business we have," he said. "We're really not seeing any trend for sales improvement over the third quarter in any area." He added that DG's sales to manufacturing customers have been hit the hardest, while sales of office automation and end-user-oriented equipment have remained strong.

CDC's announcement deepened the sense of financial crisis at the Minneapolis-based mainframe, peripheral and computer services vendor, which is currently attempting to negotiate extensions on loan agreements with its creditor banks. A CDC statement said that such discussions are proceeding satisfactorily, but analysts said they believe the success of the negotiations will depend on the creditors' confidence in CDC's profitability.

> *'If the banks get real nasty on the covenants, they could force the hand of [CDC] management.'*
>
> — William Shattuck, Montgomery Securities

"If the banks get real nasty on the covenants, they could force the hand of management," said William Shattuck of Montgomery Securities, a San Francisco-based investment firm. "[CDC] would have to come up with some pretty drastic alternatives. But if the banks think [CDC] can make money again a few quarters out, they will do what they can to keep the company afloat."

The third-quarter loss included a one-time charge of $153.8 million, resulting from the anticipated sale of CDC's low-end computer tape and floppy disk businesses, restructuring of the U.S. and overseas computer operations and write-downs on some of the firm's widely diversified non-computer businesses. The company lost $83.3 million on continuing operations in its computer business during the quarter, bringing year-to-date losses in that core division to $116 million.

"Personally, I'm not surprised about the operating results, the way things have deteriorated over the last year or so," Shattuck said. "But [CDC] just didn't say anything [during the quarter] about the decision to wind down these other businesses."

CDC's financial services business, the bulk of which consists of its Commercial Credit Co. subsidiary, was the only full division to remain profitable in both the three-month and nine-month periods ended Sept. 30.

Within computer-related businesses, CDC's Government Systems and Engineering Services divisions have reportedly remained profitable.

While CDC users contacted by *Computerworld* said they have not seen any effect on field sales and service activities during the current financial situation, one expressed concern about CDC's future direction. "We hear nothing but very black news, and we're watching it very closely," said Thomas Bohan, manager of the Scientific Computer Center at Tektronix, Inc. in Beaverton, Ore.

Tektronix was a beta test site for the CDC Cyber 170/856 mainframe, but the installation also included an IBM 3083 Model B and several Digital Equipment Corp. VAX-11/750s and VAX-11/780s. "I'm fortunate enough to have alternatives to go in other directions if necessary," Bohan said. "My main question about Control Data is, 'Where are they going to be strong in the long run?' They spun off [a supercomputer division] — ETA Systems, Inc. — but they're not very competitive in the low end with DEC and others. What is their niche? What are they going after?"

IBM installs Model 204 in its DOD site

By John Gallant

WASHINGTON, D.C. — In what could be seen as a setback for IBM's DB2 relational data base management system, which some analysts and users have faulted for poor performance, IBM's own Federal Systems Division has chosen to install Cambridge, Mass.-based Computer Corporation of America's (CCA) Model 204 relational DBMS in fulfilling its portion of a major U.S. Department of Defense contract.

An IBM spokesman confirmed that the company has purchased multiple copies of Model 204 for use in the Worldwide Information System under development for the DOD. But the spokesman denied that Model 204 had replaced DB2 as the DBMS of choice for the system.

However, a DBMS expert who asked not to be named said IBM purchased seven copies of Model 204 and has performed extensive benchmark tests in which CCA's product performed significantly better than DB2.

A CCA spokesman confirmed that IBM purchased at least three copies of Model 204 for use as "an embedded DBMS" and as a base to build a custom user interface for the Worldwide Information System, which is aimed at providing a global information net for the DOD. The spokesman would not comment on the specifics of IBM's benchmarks but said Model 204's performance was a big part of the selection criteria. He said IBM also went with CCA because it has already built a prototype DBMS written in Ada — dubbed Adaplex — and is at work on transforming that into a commercial system.

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National Semi lays off 500 more

By Clinton Wilder

National Semiconductor Corp. announced another round of layoffs last week, trimming its work force in the U.S. and Europe by approximately 500 employees.

Separately, Storage Technology Corp. reported a third-quarter loss of $14 million, or 40 cents per share, on sales of $170.2 million. The loss was less than the $64.7 million loss reported last year by the Louisville, Colo., disk drive maker, currently operating under Chapter 11 of the Federal Bankruptcy Act.

National Semiconductor, which laid off 1,300 workers in the U.S. and Europe last June and 400 employees at a Salt Lake City plant in March, said most of the job cuts will come at corporate headquarters in Santa Clara, Calif. The company will also return to five-day workweeks in January 1986 and will begin paying its employees deferred wage increases in April.

CORRECTIONS

Honeywell, Inc.'s Docu-Link product for the Microsystem 6/10 and DPS 6 minicomputer line will be available in December, according to the company.

The article "Read-write interface out connecting Nomad2, DB2" [CW, Oct. 21] incorrectly listed D&B Computing Services Co.'s address. D&B Computing Services is located in Wilton, Conn.

Computer Automation, Inc. of Irvine, Calif., expected to post a $12 million to $16 million loss for the fiscal year ended June 30. The firm's actual loss for the year was $12.7 million, or $6.17 per share, of which $8.7 million, or $4.26 per share, was a loss from continuing operations. In the fourth quarter, Computer Automation reported a loss of $6.4 million, or $3.13 per share, from continuing operations and an overall loss of $8.8 million, or $4.27 per share.

A spokeswoman said the company expects to report a loss of more than $3 million for its first quarter ended Sept. 30.

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CW 11/4/85

AT&T turns to Pick for applications

Unix potentially to tap 2,500 reseller packages

By Charles Babcock

NEW YORK — AT&T last week teamed up with sellers of Pick Systems' Pick-based applications in a move that could eventually make more than 2,500 applications available to users of AT&T's Unix operating system. The deal could bolster the usefulness of Unix, which has been faulted for a perceived lack of available applications software — a major stumbling block in the commercial data processing world.

The agreement with VMark Computer, Inc., a Natick, Mass., start-up, according to James D. Edwards, president of AT&T's Computer Systems division, would allow an estimated 2,500 applications to be migrated eventually under the VMark Universe system, increasing by threefold the number of Unix applications that AT&T has cited as likely to be on the market by mid-1986.

The applications would be marketed directly through 300 value-added resellers that offer Pick systems and software, said Roger Parsons, president of VMark. A value-added reseller takes a vendor's hardware and tailors software to the needs of small and medium-size customers, often concentrating on a particular industry group.

The value-added resellers will have the incentive of porting and selling their existing software to customers interested in the multiple lines of hardware capable of running AT&T's Unix System V, including AT&T's own 3B minicomputer line, Edwards said.

Edwards said the primary competitor to AT&T 3B minicomputers has been the IBM System/36. The 3B line enjoys "a price/performance advantage by a mile," he said, "but we have lacked the application software to exploit it."

The software of a small business represents a greater investment than its hardware, Edwards added, and value-added resellers are the best way to reach companies with fewer than 1,000 employees, he maintained.

A value-added reseller that wishes to migrate Pick-based applications to Unix would purchase from VMark a system combining hardware running Unix with the Universe data base management system and recompiler. The VMark software allows recompiled Pick applications to run under Unix, Parsons said.

Officials of both companies indicated that 20 of the 300 Pick value-added resellers have actually signed licensing agreements to make use of the VMark system.

However, it was not immediately evident how many applications the 20 resellers were in the process of making available under Unix, the officials said.

When asked how consistent the quality of the applications would be, Parsons said, "In general, the quality is very high," but he acknowledged the question was difficult to answer because the applications remain the property of the independent value-added resellers.

The Pick value-added resellers serve an estimated 28,000 business and education sites using Pick, an operating system that has typically been regarded as hospitable to applications development, according to Charles A. Cornell, vice-president of engineering and development at VMark.

Pick has been ported to Prime Computer, Inc. superminis under the name of Prime Information and runs under Primos; to the NCR Corp. ADDS Mentor; to the Ultimate Corp./Honeywell, Inc. DPS 6; to the IBM 4300; and to the IBM Personal Computer. The Pick value-added resellers typically serve legal, educational, professional, health care, manufacturing and distributing businesses, Parsons said.

The typical turnkey system installed by a value-added reseller ranges from $30,000 to $500,000. Since the Universe system will be bundled with hardware and applications software rather than sold alone, the company was not able to name a suggested retail price for it.

Support for Unix applications created under Universe would come primarily from the individual value-added reseller launching them, Parsons said. VMark will provide support for any problems with Universe and will maintain a maintenance agreement with AT&T over Unix System V problems, he said.

FCC approves AT&T SDN, Megacom tariff

By Bryan Wilkins

WASHINGTON, D.C. — The Federal Communications Commission last week granted AT&T Communications permission to introduce its Software Defined Network (SDN) service, which will permit large-volume long-distance customers to configure dynamically the use of their circuits from their premises.

Additionally, the FCC granted AT&T Communications approval of a new Megacom tariff whereby AT&T will provide business customers direct links to its switching facilities, bypassing the local telephone company's local switch. Both actions were expected despite vigorous opposition from the divested Bell operating companies, which have cited fears of lost revenue that will result in higher local rates.

The SDN service was originally proposed by AT&T Communications in March but was postponed by the FCC while it examined the service. The SDN will permit large-volume users to instruct remotely AT&T Communications' switch as to the type of transmission circuit desired, whether it be data, the data speed rate, voice, voice private line, WATS or regular voice-grade circuit switched.

Other long-distance carriers such as MCI Communications Corp. and GTE Sprint Communications Corp. have also offered similar services.

AT&T's Megacom service will offer customers with large communications traffic flows direct access to AT&T Communications' high-speed switch facilities within a local telephone company's exchange area. This will be done in a dialing format similar to the current 800-service feature. While the traffic in some instances may pass through the local telephone company switch, the Megacom tariff will not reflect the costs of handling the communications by the local switch, AT&T said.

The International Communications Association, representing large-volume users, said the two new services will significantly affect its membership. The association said the divested Bell operating companies' fears of bypass of their facilities were rooted in a "strategy to delay" new long-distance service until they are permitted to enter the long-distance arena. The communications group said the operating companies have the opportunity to file "optional alternative tariffs" if they want to fight bypass service offered by long-distance carriers — something that has not been done, the group said.

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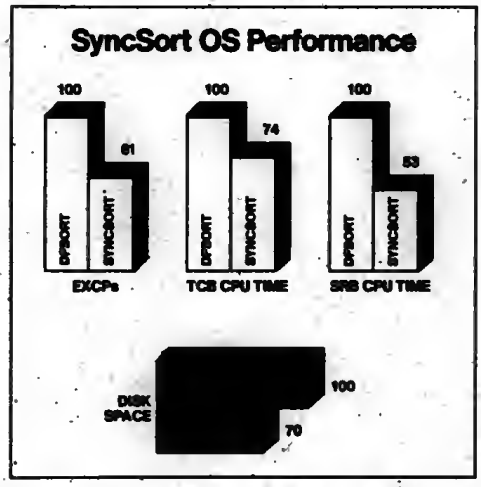

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From page 1

On the job: Hartford's blueprint for a DP hire

converted one system to another. Municipal data processing experience was preferable but not a strict requirement. From the initial pool, the list of candidates was cut to approximately 40 people.

Candidates were mailed a five-page questionnaire that asked them to describe their leadership style, management expertise, interpersonal skills and knowledge of IBM 4300 or 3080 series mainframes. Included in the package were promotional materials for the city and the department's planned information center.

Approximately three-fourths of the candidates returned their responses before the two-week deadline. Erdmann's group narrowed the list to eight candidates with a wide range of backgrounds. All eight had IBM mainframe experience; some had worked with Digital Equipment Corp. devices, and others had supervised migrations from Honeywell, Inc. equipment to IBM machines. One candidate lived in Connecticut, a second worked in the state, and the rest were from out-of-state locales as far away as California and Arkansas.

The candidates were brought to Hartford for a question-and-answer session with a four-person panel that consisted of the acting director of DP, the deputy director of the Metropolitan District Commission and DP professionals from Travelers Insurance Corp. and Cigna Corp.

The oral questions were more challenging than those in the questionnaire. Oral questions ranged from describing the use of a project management system to listing the steps needed to take charge of an ineffective committee made up of peers.

Each candidate spent one hour with the panelists. "If a panelist thought that an answer was superficial, he could ask a follow-up question," Erdmann noted. He added that a few candidates were intimidated by the process.

After each session, candidates talked with the city manager, went on a tour of the DP facilities and those unfamiliar with Hartford were given a tour of the city.

The sessions took place over two days. On the second day, Hurricane Gloria made its East Coast tour and caused some problems. Two of the panelists never came in for their interviews, and one of the job candidates was forced to spend an extra night in Hartford. "There are just some things you can't plan for," Erdmann said.

Another unplanned circumstance was that the acting DP director, who was not considered for the permanent position, resigned after taking part in the candidate interviews.

> *"The search for a DP director for the city of Hartford could serve as a model of efficiency for other municipalities or corporations."*

With the interviews completed, the board compared notes and listed the top six candidates in order. "I was surprised that the ratings were as similar as they were," Erdmann noted. The two bottom candidates were dropped from further consideration because their experience looked better on paper than it did in person.

Shaw's name was etched at the top of the list. He was overseeing an IBM 4341 installation, had worked at the city of Boston's data processing center and, as a member of the National Guard, had converted some Burroughs and Honeywell machines to IBM — almost a perfect candidate.

Erdmann checked Shaw's references, which consisted of two consultants, the director of computer services at a hospital and a vice-president of information services at a hospital.

After the references were checked, Shaw was invited to lunch with the city manager. Over the first course, he was offered the job.

It had been six years since Shaw had made his last company switch and accepted a position as head of management for systems and programming at Rhode Island Hospital. When the hospital's director of DP moved to greener pastures in 1983, Shaw became director of DP.

The soft-spoken Shaw was reluctant to list the reasons for his job search. He did state that Hartford demonstrated a stronger commitment to implementing end-user computing than the hospital had. Also, the hospital had divided traditional data processing and end-user computing into two separate groups managed by two different people rather than allowing the DP director to oversee all computing functions.

For a year he had casually looked for another job and had interviewed at Bank of Boston. He began an earnest search at the beginning of the summer, and Hartford represented his first — and last — noteworthy interview. Before he finished dessert, Shaw had accepted the position.

■

City revamps DP operations

By Paul Korzeniowski

HARTFORD, Conn. — Old-time data processing professionals for the city of Hartford have noticed a recent change in management's attitude. For a long time, the city had been a proponent of a "Let's get it done tomorrow" mentality.

This outlook changed last December when Mike Brown, assistant city manager, was hired to move the city from its antiquated batch outlook to an on-line orientation. Brown, a diminutiva dynamo who could find a silver lining in a black hole, has aggressively taken charge of the process, and city managers, DP professionals and local politicians are quickly working to revamp the city's hardware and software.

The first item on Brown's agenda was to decide what should replace two Burroughs Corp. 6930 mainframes, which were approaching the last of a five-year contract. The city sent out requests for proposals to approximately a dozen vendors in June.

One month later, the proposals had been evaluated, and an IBM 4381 was purchased. It was delivered at the end of August. "A lot of employees bet that the city couldn't operate as quickly as it did," Brown said.

Software packages were also needed. A new payroll system from McCormack & Dodge Corp. was chosen. The city plans to establish an information center to move data from the data center to the fingertips of city officials.

IBM's Professional Office System, Software AG's Adabas data base management package and Supernatural, a fourth-generation language, have been purchased.

The city is moving just as quickly to get the packages up and running. The hardware and its operating systems have been installed. Some payroll modules are up, and the full system should be in place by January.

Moving all applications from the Burroughs to the IBM machine will require at least four years. Some applications will migrate from the Burroughs machine. Other vendors will replace existing packages, and the city may develop a few of the systems. "Historically, we wrote most of our programs," Brown noted. "We want to break out of that mold and incorporate vendor offerings."

In the next five years, the city will spend $3.1 million — $1.1 million for hardware and $2 million for software. Even the best equipment is useless without someone who understands how to work with it.

So, training has and will continue to play a key role in the transition. "We have sent all of our technical people to the vendor training classes," Brown said. All of the city's system technicians were attending an Adabas class on the day when the city's new director of data processing was introduced to the press.

A reorganization of the city's DP department, which had grown from 40 to 55 people in the last year, coincided with the changes. "The city council agreed to fund the conversion as long as it did not mean a dramatic increase in staff," said Lee Erdmann, assistant city manager. "So, we [have] to make sure we use our existing resources wisely."

Leasing industry growth outpaces hardware sales

By Clinton Wilder

HOT SPRINGS, Va. — The growth of the computer and peripheral leasing industry will continue to outpace hardware sales this year but will not match its earlier growth rates, according to the projections of International Data Corp. (IDC) in Framingham, Mass.

The second annual IDC leasing industry survey, released at the Computer Dealers and Lessors Association (CDLA) meeting in Hot Springs, predicted that U.S. computer leasing and brokering of used equipment will generate $9.25 billion this year. The projection is a 25% increase from $7.4 billion in 1984 but less than the 30% annual growth during the next five years that IDC projected in its 1984 survey.

"Despite our revised figures, computer leasing is continuing to outpace the growth of the overall information processing industry," said survey coordinator Charles Greco of IDC. "We're talking here about a very healthy industry."

Trend away from all-IBM leasing

The IDC results further indicated a small trend away from all-IBM equipment leasing to writing leases on hardware from other computer and telecommunications vendors. The number of lessors dealing only in IBM equipment dropped from 27% in 1983 to 17% of respondents to the 1984 survey, although firms leasing primarily IBM gear rose from 69% to 76%. "This surprised us," Greco said. "What accounts for the remainder [of the increased overall market] is that lessors and dealers are diversifying their portfolios, with a big push toward the telecommunications market."

The market impact of IBM Credit Corp. — a major concern of CDLA members one year ago — appears to be significant but not overwhelming. While IDC still rates Big Blue's leasing arm as the market leader with a 4% share, third-party dealers are still thriving in the expanded overall marketplace. The number of survey respondents who said IBM Credit would have a severe or significant impact on their own businesses decreased from 53% in 1983 to 43%. That perception changed even as IBM Credit's revenue grew by a whopping 82% to $296 million in 1984.

"[IBM Credit] is a tough competitor but a welcome competitor," said CDLA President Harry Goetzmann, chairman of Continental Information Systems Corp. in Syracuse, N.Y. "In a sense, [IBM Credit has] given our industry a lot of credibility."

The IDC survey concluded that the third-party leasing industry "has sustained IBM Credit's best competitive shots and still managed to climb to record heights."

While the industry still consists mainly of small organizations, those organizations are growing. The number of respondents grossing less than $5 million in annual sales dropped from 68% in 1983 to 50% in 1984, while the number in the $5 million to $25 million range jumped from 23% to 34%.

Based on survey results, the IDC composite profile of an average U.S. computer leasing company in 1984 said the firm is 6 to 10 years old, based in the Midwest, doing $1 million to $5 million a year in sales, with its main business in computer peripherals. Approximately two-thirds of the typical firm's revenue comes from leasing and one-third from brokering computer hardware. About half of the leases written by the firm contain value-added services — such as insurance, maintenance or disaster recovery services — in addition to financing.

Switch gives user firm telephone company power

PBX coordinates voice traffic for 20 facilities

By Paul Korzeniowski

LOWELL, Mass. — A number of large corporations are installing private branch exchanges (PBX) so powerful that they rival the routing power of some independent telephone companies.

One such firm is Wang Laboratories, Inc., which has purchased and installed a 5ESS switch from AT&T. Merrill Lynch, Pierce, Fenner and Smith, Inc. also has reportedly purchased the 5ESS, and General Motors Corp. and Boeing Co. are said to be seriously considering 5ESS purchases.

Wang is using the 5ESS as a hub to coordinate voice traffic for 20 facilities located within a 20-mile radius of its Lowell, Mass., headquarters. The switch acts in tandem with PBXs in each of the remote locations.

PBXs connected with T1 link segments

Most of the PBXs are connected to the 5ESS with T1 link segments borrowed from spare capacity on a CATV broadband network that Wang runs between its buildings. Locations with smaller PBXs are connected by lease lines to satellite locations where the traffic is aggregated by channel banks into T1 links. Although the 5ESS is capable of supporting smaller bandwidths, all lines into and out of Wang's switch work with T1 bandwidth.

The network replaced a New England Telephone Co. tie line system. The broadband network enables Wang to bypass the local telephone company for all intraoffice calls and sends local calls by the least expensive route. Long-distance calls are automatically sent to the least expensive of the company's three carriers, AT&T, MCI Communications Corp. and GTE Sprint Communications Corp.

The 5ESS also supports a microwave link that connects Wang's Lowell office directly to MCI Communications and Western Union Co. offices in Boston. This bypasses New England Telephone, further reducing the cost of routing traffic to these carriers.

The microwave link also ties into a foreign exchange line that connects Wang's Boston office to a suburban facility, enabling Lowell workers to be charged as if they were calling from Boston.

Robert Uhl, director of telecommunications at Wang, would not put a price tag on the network but did state that the 5ESS installation would pay for itself in 18 months.

"In addition to the cost savings, the network supplies us with more capabilities," Uhl noted. The 5ESS routes calls between the various facilities so that an employee at any office can dial a second employee by simply entering "1" and then the person's number.

Uhl listed two reasons for purchasing the 5ESS: the need for a cohesive central office network and a desire to position the company so it would be able to use future network services such as those offered by an integrated services digital network (ISDN).

Independently, the various Wang facilities had purchased PBXs, leaving the company with equipment from AT&T, Northern Telecom, Inc., Rolm Corp. and Stromberg Carlson.

Two years ago, Wang evaluated 15 vendor offerings in search of one to tie its offices together. "AT&T shared with us its plans to incorporate ISDN capabilities into the 5ESS, and they met our long-term objectives," Uhl noted.

Installation and maintenance of the switch falls under the aegis of a 45-person telecommunications staff. "The staff is only 4 years old and has grown very rapidly," Uhl noted. Most of the staff was ferreted out from other departments, and the employees have taken a number of technical vendor seminars.

Uhl reported few problems in hooking existing PBXs to the new switch, a process that in most instances took only one or two days. Some problems were encountered because the older switches were not designed to work with T1 lines. "In the past few years, we tried to purchase products that could support T1 lines," he said. "It has been difficult to retrofit our older switches to the 5ESS," he added.

Generally, Uhl said he is satisfied with the 5ESS. Like many telecommunication managers, he would like to see better reporting capabilities from the switch. "The maintenance tools are fine, and we are usually able to quickly locate a problem on the network," he said.

Currently, no data is sent through PBXs, but there are plans to add that capability. "We are testing a dial-up 56K bit/sec. circuit on a [Northern Telecom] SL1," he said. "I expect to fully integrate that capability in January or February of next year."

Also, the 5ESS has not been used as a hub for a national voice network. "We don't have enough traffic to justify installing our own national voice network," Uhl said. He added that the company is more likely to consider a virtual private network, a software-defined network or a hybrid network.

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SOFTWARE ENGINEERING OF AMERICA SEA

Seafirst Bank sets plan for mass upgrade to Fat Mac

By Peggy Watt

SEATTLE — Washington state's Seafirst Bank, the first large corporate buyer of Apple Computer, Inc.'s Macintosh computers, has decided to upgrade all of its 1,000 systems from the basic 128K-byte models to the so-called Fat Mac with 512K bytes of random-access memory (RAM) through a third-party supplier.

Approximately 200 of Seafirst's 850 installed Macintoshes have already been upgraded by Voad Systems of Los Angeles, and the rest will be upgraded in turn as they arrive from Apple, said Timothy Turnpaugh, senior vice-president of Seafirst's technology division. He expects Seafirst will order at least another 1,000 Macintoshes next year, which will probably be 512K-byte RAM machines from the start, even if they are also upgraded by a third party.

"We don't want to run a split system. It hampers transportability," Turnpaugh said. He added that the original 128K-byte Macintoshes are rapidly disappearing from the market.

Turnpaugh said he always intended to upgrade Seafirst's Macintoshes eventually, but the combined factors of price and the machines' use at the bank made initial purchase of the Fat Macs inappropriate.

"The spread in prices back in February [when the first Macintoshes arrived at Seafirst] was significantly larger than is in the market today," Turnpaugh said. "Also, we had rookie users then. It took them awhile before they started stressing the machine."

The first Macintosh software that Seafirst employees used — Macwrite, Macpaint and a terminal emulation program that allows users to tap the electronic mail system that runs through Seafirst's IBM System 3084 Model Q96 — would not have required or exploited the higher capacity computers, Turnpaugh elaborated. But now, he continued, Seafirst's users are turning to such integrated business software as Microsoft Corp.'s Excel, Lotus Development Corp.'s Jazz and the utility program Switcher, from Apple, which do take advantage of greater internal memory. The next wave of Macintoshes may bring some different programs into Seafirst's offices, Turnpaugh indicated.

Seafirst, a subsidiary of Bankamerica Corp., was the first major investor in the Macintosh office concept and has networked Macintoshes throughout its eight major Seattle-area sites as well as distributing them at 159 branches in Washington state. Ironically, Bankamerica is still evaluating the Macintosh's potential as an office computer.

By the end of next January, every Seafirst branch in the state will have at least one Macintosh, Turnpaugh said. By the time the Mac invasion ends, perhaps in early 1988, he expects 3,000 Macintoshes will be distributed among Seafirst's 6,800 employees. "If you've got a desk and a phone, you'll get one," he said.

Currently at Seafirst, the machines share Apple Imagewriter printers and are used for accounting, word processing and general computing by employees at all levels.

"We had some users who had driven their 128K machines to exhaustion" even before the upgrade started, Turnpaugh said. A real estate group got one of the first pilot upgrades because of its rigorous spreadsheet use. The bank also bought a few stand-alone Mac disk drives for users who needed that boost, he said.

The third-party upgrades by Voad were the best economic deal for Seafirst, at a price of less than $100 per machine, Turnpaugh said. Voad routes about 50 Seafirst Macs at a time through Voad's Woodinville, Wash., manufacturing facility and swaps the entire board for the upgrade.

"It's not our first corporate account, but it's one of our biggest," said Voad President Dan Praeger, who suspects the project is the single largest Mac upgrade. He said the 4-year-old company is upgrading about 300 Macs per month, since launching the service in February. It still manufactures its initial offerings, automatic dialers for telephones.

Voad offers a 120-day warranty on its upgrade work, which supplements the 90-day Apple warranty that has usually run out by the time of the upgrade, Praeger said.

For single orders, Voad ships the Mac owner a new board plus installation instructions and pays the postage to get the old 128K board, which it restocks for the next upgrade. Voad also sells heftier upgrade kits to boost a Mac's capacity to 2M bytes.

Kapor changes Lotus role

By Eric Bender

CAMBRIDGE, Mass. — Lotus Development Corp. founder Mitchell Kapor has reassumed an operational management role, taking on general manager duties at the company's core Business Products Division.

Kapor remains chairman and will continue to act as "guru for all software development," as one Lotus official put it. Edward Belove, vice-president for corporate research and development, will direct cross-divisional product development work.

The Business Products Division produces and markets 1-2-3, Symphony and Jazz. While the move raised some eyebrows outside the company, the official noted that 110 of the division's 150 employees work in product development, making a good match with Kapor's talents.

Kapor replaces Charles Digate, who returns to the international division as vice-president and general manager. Digate's move recognizes "that our international operation is the fastest growing business segment," said Lotus President Jim Manzi.

IBM exec reaffirms laptop

Discusses firm's OA plans at FOAC meet

By Mitch Betts

WASHINGTON, D.C. — Robert G. Myers, IBM's director of office and communications systems product line planning, last week reaffirmed IBM's intention to introduce a laptop microcomputer.

"I think you can anticipate . . . our company will be introducing a product in that market segment," Myers said in response to a question at the Federal Office Automation Conference (FOAC) last week. He referred to a recent statement by IBM Entry Systems Division President William Lowe that hinted at such a move [CW, Oct. 28], but Myers gave no details.

In his presentation at a FOAC session titled "Executive Perspective," Myers said IBM continues to have a strong interest in voice messaging, telephone management and speech recognition products like those unveiled last month [CW, Oct. 21].

Furthermore, Myers suggested that IBM is developing a high-resolution workstation for image processing, coupled with mass storage on optical disks. "We see image processing as the next big explosion in personal computing," Myers said, adding that IBM's goal is to make this technology more cost-effective.

Christine Hughes, an office automation market analyst at the Gartner Group, Inc. in Stamford, Conn., predicted that voice messaging, speech recognition, image processing and natural query languages are the OA technologies most likely to make inroads into U.S. offices in the next five years.

Hughes further predicted that alliances, mergers and acquisitions among OA vendors will increase in the next few years as users demand integrated OA solutions, so that the surviving vendors will be either very large or very specialized.

By 1990, personal computers in the office will use 32- or 64-bit chips, have standard random-access memory of up to 5M bytes and have a built-in high-speed modem and local network interface, added Robert E. Vernon, vice-president of office information systems for Sperry Corp.

Vernon said these personal computers will cost about the same as today's units, approximately $3,000 to $5,000 each.

Robert V. Adams, president of Xerox Corp.'s Xerox Systems Group, urged the FOAC audience of government managers to pressure vendors into adopting the Open Systems Interconnect computer networking standard, so that users can create optimal multivendor OA systems.

From page 1

Apple push on for more system links

use:" In explaining Apple's commitment to develop network systems rather than compromise the Macintosh operating system, Sculley said, "Looking at compatibility only at the operating system level ignores the basic direction of the industry. That direction is toward a systems world where data files can be accessed over networks, and compatability really means whether a workstation can exchange information with other computers effectively."

As the need to tie systems together increases, operating systems will become less of a determinating factor for true compatability. "If compatibility rests at the network level, it means companies can select appropriate alternatives regardless of their operating system," he added.

Sculley cited his firm's Appleline, an IBM 3278 terminal emulator, as an example of Apple's plans, saying that future enhancements for Appleline would enable the Macintosh user to transfer text or binary files to and from the mainframe.

In addition, Apple is beta testing an application that allows users of the Macwrite word processing program to send and receive files from an IBM mainframe through the Revisable Form Text DCA link.

Apple is also planning "support for IBM's Token-Ring network," Sculley said. However, he did not elaborate.

Sculley also said Apple is developing software systems with third-party vendors that will "fully integrate" the Macintosh with the DEC VAX/All-In-One and Ethernet environments. "A Macintosh front end on All-In-One is what we want for our own use at Apple, and I believe so will a lot of their DEC corporate customers."

As private branch exchange systems are becoming increasingly important in data communications, Apple will "attempt to work directly with individual vendors in co-development relationships to provide Macintosh connections to their systems," according to Sculley. Among products from communications vendors, Northern Telecom, Inc.'s Lanstar and AT&T's Starlan were said to be "particularly important."

Apple is also working with such on-line information services as Dow Jones News/Retrieval Service to create a Macintosh front end for the services, Sculley added.

Apple has been preaching more or less peaceful coexistence with IBM for well over a year but has been slow to deliver communications products. As one example, the long-promised file server for the Appletalk local-area network has yet to appear.

The company has increasingly emphasized cooperative work with independent vendors. But many third-party products also have been delayed, among them Appletalk-compatible offerings from local-area network suppliers.

"We're waiting for Apple to define the direction they are going to take with a multiuser operating system," said a spokeswoman for Novell, Inc. of Orem, Utah.

However, developing products to emerging IBM standards such as the Token-Ring and LU6.2 may give Apple a chance to play catch-up in communications offerings, other suppliers said.

"LU6.2 is a key piece," said Paul Rampel, president of the Orion Group in Berkeley, Calif., a communications software vendor. "LU6.2 support would be a nice way to try to catapult over the whole past history of SNA."

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Chicago	Oct 16, Dec 12	New York City	Oct 10, 25, Nov 6, Dec 12	San Diego	Nov 7
Cleveland	Nov 5	Newport Beach	Oct 17	San Francisco	Nov 5
Columbus	Oct 8	Oklahoma City	Nov 7	San Jose	Oct 24
Dallas	Oct 8, Nov 13	Omaha	Oct 24	Seattle	Oct 2, Nov 26
Dayton	Oct 9	Orlando	Oct 15	Syracuse	Nov 7
Denver	Oct 29, Nov 20	Phoenix	Oct 9	Tulsa	Oct 29
Detroit	Oct 22, Nov 12	Portland	Oct 10	Washington	Oct 10,24, Nov 7, Dec 10
Houston	Oct 31, Nov 21	Rochester	Oct 10, Dec 5	Wichita	Oct 3
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From page 1

IBM users confused by net reversal

The new Type 3 cable costs roughly one-sixth as much as the Type 2 cable typically used today. Type 3 cable is available with two, four or six pairs of nonshielded wire. The older Type 2 cable contains two pairs of shielded twisted-pair wire for data and four pairs of telephone-type wire for use with private branch exchanges.

According to Frank Mitchell, IBM Cabling System product manager for Anixter, Inc., an authorized dealer of the system in Skokie, Ill., Type 3 cable containing six wire pairs — the same number as in Type 2 — costs $58 per 1,000 feet, compared with $400 per 1,000 feet for Type 2.

Although less expensive, Type 3 cable is also less capable. The maximum permissible wire length with Type 3 cable is specified at 330 feet, as opposed to 990 feet with Type 2 cable. Type 3 cable has been tested at data rates of up to only 4M bit/sec., compared with the 16M bit/sec. test specifications for the shielded Type 2 cable. Type 3 cable supports a maximum of two wire closets per ring, whereas Type 2 cable can support up to 12.

Specifications for the maximum permissible cable length between IBM 3270-type peripherals and controllers are less stringent because of the lower maximum speed required, roughly 2.5M bit/sec. Type 3 cable can support 3270s at up to 900 feet, and Type 2 can reach to 2,000 feet.

Even though the majority of the cost to install a Cabling System is in labor expense, wire prices can result in substantial differences in system price. Burns estimated that the Cabling System costs four times as much as a twisted-pair alternative.

'I'm a little suspicious'

Price aside, Jack Fetzer, corporate director of telecommunications at Lockheed Corp. in Burbank, Calif., is not so sure the nonshielded Type 3 cable is the way to go. Lockheed is planning to install Type 2 cable in a new three-story building. "Type 2 appears to be somewhat of an overkill after IBM's announcement [of Type 3 cable]," Fetzer said. "However, I'm a little suspicious about sending data over unshielded twisted pair."

Fetzer explored the idea of using twisted-pair wire for data at a trade conference last year. Most of the vendors supported 1M bit/sec. transmissions, and some boasted they could support 2M bit/sec. — but in a laboratory environment. "If you pinned them down," Fetzer said, "they would say the wire had to be shielded or had to be in an entirely separate cable from your voice wire. Now IBM is coming out and talking about 4M bit/sec. It makes me suspicious."

One user has found nonshielded twisted pair, while not 4M bit/sec., to be perfectly adequate to support the 2.5M bit/sec. communications traffic typical of 3270 devices.

A communications manager for a large oil company who wanted to remain anonymous, said that his firm uses a Type 2 Cabling System within some areas of his company but standard non-IBM twisted pair to support other 3270 peripherals. His company uses twisted-pair wire to connect roughly 400 3270 terminals to controllers at distances of up to 1,200 feet, almost 300 feet beyond IBM recommendations.

The manager said the twisted pair works fine, even though the links can include up to five connections or splices.

While cable choice will revolve around the user's unique requirements, Fetzer learned an interesting lesson: Shop around. Fetzer said once he decided on the system he wanted, he issued a detailed request for bids. The bids ranged from $90,000 to $360,000. "It's clear some people don't know how to price this thing."

HINTS FOR THE COMPETITION

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MICRO TERM INC

3Com net software bows

Department, corporate network links targeted

By Eric Bender

MOUNTAIN VIEW, Calif. — A next-generation line of software is scheduled to debut today from 3Com Corp., a leading vendor of personal computer local-area networks. Boosting links between networks, the new 3+ software broadens 3Com's offerings "to wide-area interconnection at the departmental and corporate level," according to company Chairman Robert Metcalfe.

Among other enhancements over the company's existing Etherseries, 3+ features a file server architecture, which permits network applications to control shared multiuser access down to the file level, according to 3Com Marketing Vice-President Roselie Tobes. Additionally, 3+ offers dial-up access to all network functions, allowing diagnosis and maintenance of multiple networks to be carried out from a central site.

In addition, a naming service gives all network users and resources one fixed name and lets them be addressed simply by that name, without requiring a physical location or network address, she said. This service extends to multiple separate networks and remote stand-alone systems, tying them together completely transparently through a single-name directory, Tobes claimed.

"They're positioning themselves to handle larger nets in the corporate market," commented Harvey Freeman, vice-president at Architecture Technology Corp. in Minneapolis.

Written to support IBM's PC-DOS 3.1 and Microsoft Corp.'s MS-Net Redirector standard, 3+ will run all programs written for the IBM PC Network, Tobes said. The new 3Com software will be offered for four networks: Ethernet, the IBM Token-Ring network, AT&T's Starlan and Apple Computer, Inc.'s Appletalk.

The Ethernet version will be delivered in January, with the Token-Ring software offered in late first-quarter 1986, Tobes said. Schedules for the other networks were not released.

The 3+ line includes 3+Share, a distributed operating system; 3+Route, which links 3+ networks through asynchronous phone lines or dedicated lines; 3+Remote, which gives remote personal computers full access over phone lines; 3+Mail, which gives store-and-forward electronic mail transfer; 3+Menus, which permits users to access network resources and applications through menus and windows; and 3+3270, which permits networked micros to emulate IBM 3278 and 3279 terminals, routing communications through a network workstation emulating a 3274/3276 controller.

The software family has been priced in two ways, the first for up to five users and the second for an unlimited number of users. The 3+Share system costs $550 and $1,100, respectively, while 3+Mail is priced at $250 and $500. The 3+Menus offering (which, unlike the other products, will ship in March) costs $150 and $300. The 3+Remote product is priced at $295 per remote workstation. The 3+Route tool costs $1,250 per server.

The software supports both IBM Personal Computers and compatibles, with either 3Com products or other workstations acting as servers.

The 3+Path product, bundled with 3+Share or available separately for $500, allows Etherseries and 3+ to coexist on one network and permits Etherseries 2.4 users to migrate to the new software, Tobes said. However, she cautioned that the software is "not a 100% upgrade path," because applications employing semaphore locking schemes will have to be rewritten. The company will continue to sell Etherseries software for Ethernet networks.

The 3+ family also features enhanced backup facilities, with users able to back up their work down to the file level.

Pacific Bell tests integrated voice/data multiplexer

SAN FRANCISCO — Pacific Bell Telephone Co. has signed up some 200 residential and small business customers to field-test a multiplexer that increases the capacity of a single copper telephone wire sevenfold.

Project Victoria, as the six-month new technology trial is called, is the realization of the product's announcement in March, when Pacific Bell applied for patents on the technology. The patents are still pending, and more are currently being filed, according to John Lucas, a Pacific Bell spokesman.

The Project Victoria technology, which was called a breakthrough when Pacific Bell first announced it, combines and compresses voice and data signals to enable a telephone line to handle two digitized voice channels. It includes one full-duplex, 9.6K bit/sec. data channel and four full-duplex, 1,200 bit/sec. data channels as well as an additional optional channel for signaling.

> *Project Victoria combines and compresses voice and data signals to enable a telephone line to handle two digitized voice channels.*

Pacific Bell said the equipment also accommodates fiber-optic lines and any digital or analog switch now on the market.

Key testers will be approximately 200 residents, many of them Pacific Bell employees, and a few as yet unnamed small businesses in Danville, Calif., that will have access to a menu of on-line services that will enable them to test the new capability, Project Victoria manager Jill Lander said. Multiplexers will be installed at participants' homes and at the Danville central office switch, one of Pacific Bell's newest operations centers. All will be activated in February 1986 for a six-month trial.

Though Pacific Bell is prohibited by the Federal Communications Commission from manufacturing the equipment itself, the telephone company is permitted to make the prototypes for the trial, Lucas said. No manufacturer has yet been signed to produce the product.

Supplying other equipment for Project Victoria participants' use in the trial are Apple Computer, Inc., which will loan Macintosh computers to all 200 of the test sites, and software developer Solutions, Inc. of Montpelier, Vt., which will provide its communications software called Straight Talk, published by Dow Jones & Co., according to Lander.

Maynard, Mass.-based Digital Equipment Corp. will provide a Microvax II to run an electronic community bulletin board system for Project Victoria participants to call as part of the trial.

The bulletin board system, which will also be accessible to callers who are not part of the trial, will feature the services of Chronicle Videotex, an entertainment information listing run by Chronicle Information Services, located in San Francisco, and additional information on Danville-area events.

Project Victoria participants will also be given access to an on-line data base from Dow Jones Information Services of Princeton, N.J., and MCI Mail from MCI Communications Corp. of Washington, D.C.

Pacific Gas & Electric Co. of San Francisco will conduct a small trial of its own by asking some Project Victoria participants to help track their power use, offering them breaks on electricity rates for off-peak use. The utility will offer all participants new, on-line home energy audits and customer information services, and if the programs are well received, they may be installed at kiosk terminals in the utility company's branch offices for any customer to consult, said John Caskey, Pacific Gas & Electric supervisor of load management technology.

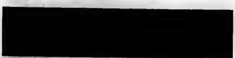
"I think there is a large potential for [Pacific Bell and Pacific Gas & Electric] to work together in the future," Caskey said, mentioning on-line billing and energy-use monitoring.

Security Pacific National Bank, based in Los Angeles, will give participants access to its new electronic PC Banking service.

Another potential Project Victoria trial participant is the San Ramon Valley School District in California, which has talked with Pacific Bell about establishing an on-line message service for updating records, instructor memos and home lessons, Lander added.

Danville was chosen as the trial site because Pacific Bell found it had a "high proportion of people interested in electronic services" and because of the convenient proximity of a new Pacific Bell operations center, according to the company.

Though the on-line services are available by using most modem-equipped microcomputers, trial participants will use the same systems for uniformity, Lucas added.



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From page 1

'Get tough,' DP managers urged

Conference and Business Exposition, signaled an effort to recruit major users to his cause.

Goodman's guidelines focus on product designs employing an intelligent architecture that would provide users with maximum flexibility. The guidelines included the following:

- An intelligent architecture must be used that isolates key system components to accommodate changes in operating environments and technology.
- Applications software must be flexible enough to address individual user needs.
- Applications software must be event oriented, allowing users to combine or chain processing events to reflect their business practices.
- Applications software must be a working partner in the information center, allowing for easy interface and integration with other products and inquiry tools.
- Common functions or tasks should be provided through a single, shared software module.
- Applications software must support the trend toward expansion of functionality to networked personal computers.
- Applications logic must be independent from other key components of the applications software.
- Applications code must be in a generally accepted programming language and not nonstandard or proprietary languages.
- Applications software must use standardized reporting and inquiry tools so users can retrieve information easily.
- Applications must be developed in an automated fashion to provide users with high-quality products expeditiously.

Goodman also suggested five standards that could comprise a profile of how the ideal applications software company should operate. Among those standards were the proposals that vendors limit product announcements to 90 days before commercial availability; that the product be serviced by a dedicated organization; that the vendor should supply multitiered education and support; that products be installed in a quick, clear and efficient manner; and that vendors provide support when the users need it.

Attendees reacted favorably to Goodman's speech but emphasized that what he proposed could only be used as guidelines not standards.

One systems analyst said Goodman's suggestions were like a preacher's sermon — good to use as goals but tough to carry out in the corporate world where top management makes decisions based on dollars and cents, not on whether a vendor can deliver a product as promised.

Another attendee, L. R. Handy, director of MIS for Dibrell Brothers, Inc. of Danville, Va., added that standardization could hurt the innovator. He said, "Standardization is good, but we still need that guy who will come up with a [Lotus Development Corp.] 1-2-3. Let's keep standards as guidelines. If we standardize too much, there might just be a few leaders with everybody else following."

■

In other occurrences at the DPMA conference, personal development and general management seminars grabbed as much attention as technical sessions and exhibit floor activities. The 1,100 DP managers, supervisors and directors filled conference rooms for seminars dealing with end-user programming, information centers and artificial intelligence. However, attendence at those sessions was matched by the turnouts for general management and personal improvement presentations about such topics as motivating personnel and "How to have a great day."

Attendees interviewed at the conference said they wanted that mix of topics and noted that the gathering was an association meeting more than a product and technology showcase. Several managers said their primary purpose for attending was to get information on DPMA's educational programs so they could return home to work with local high school and college authorities in DP curriculum development.

"I've talked to quite a few people in terms of what is happening with DPMA and picked up some things that I wasn't aware of. They have already mapped out what should be covered in high school and college," said Les Bough, manager of technical systems for Home Oil, Ltd. of Calgary, Alta., noting that some schools produce graduates "who can program like the devil but don't know how to get along with people." He said it can take three years for a programmer to learn how to communicate with other workers and to understand the business world.

Another attendee with an interest in education, Wilfred R. Ramlall, chairman of computer sciences at Rollins College's Patrick Air Force Base in Palm Bay, Fla., said he was a nonmember attending his first DPMA conference. He noted, "I was primarily interested in getting to know the organization and in how DPMA is working to get the proper curriculum developed."

Ramlall reported that he viewed several state-of-the-art products on the show floor in which he was interested. However, he and other attendees said their primary purpose in attending was not to shop for hardware and software.

■

Vendors generally said traffic on the exhibit floor, which featured 80 exhibitors, was sporadic, suffering at least partly because of the threat of Hurricane Juan 100 miles to the east.

One exhibitor who reported a steady stream of booth visitors was Jorge Cordova, director of major account sales for CPU Corp., a Houston distributor of local-area network and microcomputer products. He said, "We were swamped on Monday from 8 a.m. on, even though the floor didn't open officially until 10. There were a lot of buyers — managers and MIS directors. I have maybe 15 leads that I think I can turn over in 90 days. I don't know why there was so much interest. Maybe it was the product itself. Local-area networks are just coming of age."

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NEWS

Early Supra user claims DBMS boosts productivity

By John Gallant

MILWAUKEE — An early user of Cincom Systems, Inc.'s newly announced Supra said the data base management system's (DBMS) relational architecture and its information access and data administration tools promise to boost programmer and end-user productivity significantly.

When the Information Systems department of Northwestern Mutual Life Insurance Co. set a goal of doubling its development productivity in three years, Michael Backus, assistant director of the department, knew the group would need sophisticated data management tools. That is exactly what Backus thinks he has in the Supra relational DBMS, which was unveiled in September [CW, Sept. 23]. Northwestern Mutual, which recently migrated all of its production systems to Supra from Cincom's older, nonrelational Total DBMS, is one of the first users of Supra.

Northwestern has nearly two million customers, many of whom have a variety of policies in force. On an IBM 3081 Model G under MVS/XA, Information Systems supports 28 major insurance-related applications. According to Backus, the 28 data bases supporting those applications comprise 270 files that occupy nearly 50 IBM 3350 and 3380 disk drives. By itself, the largest of those files contains more than 4 million records and takes up three 3380 units.

After an extensive product review, Backus said, Northwestern Mutual decided more than two years ago to use Supra, which was then still under development, as the backbone of its future information systems architecture. Beginning in mid-1984, the department put Supra through an exhaustive test gauntlet. The group then redesigned the interfaces between applications and Total data bases to work with Supra. Two weeks ago, Northwestern began running its production work under Supra.

Had to go relational

"We could not achieve our productivity goal with Total. It was just costing us too much time and effort to build new systems and, more important, to maintain systems," Backus said. "We had to move to a relational architecture to insulate our applications from our data bases. That cuts down on our development and maintenance time, and it lets our end users begin to do things on their own. They can now get at information without having to go through all the programmer-type things that were once involved in accessing data."

Formerly, Backus said, when a member of his more than 170-person applications development staff wanted to increase the field size within an application or add a new data type, the data administration staff, which comprises eight people, faced an unenviable task.

"In the past, applications accessed whole records, even if they only needed data from two fields within the record," Backus said. "So if we needed to add a new data type or increase a field size, we had to redesign the physical data base and reload the whole thing with the larger sizes or added data. That became a multidivisional effort, and it was a bear of a job."

Backus said Supra's data normalization tools are helping Northwestern Mutual reorganize data bases so that applications are independent of the data they use. (Normalization, simply put, is the process of reducing data to its most basic form.) Thus, when an application is modified, the data base need not be redesigned. And, when changes in business operations prompt the restructuring of data bases, no maintenance is required for production systems.

"Supra forces you to get away from organizing your data physically," Backus said. "It forces you to look at the interrelationships among data. It makes you look at your data from a logical view. Then, Supra handles the creation of the physical data bases; it builds them using that logical view.

"We are looking at our data in a completely different way than we did in the early 1970s," he continued. "Only by doing that can we have data bases that are appropriate for an end user to access. Only then can our applications programmers change a record or field without having to worry about the data base."

The relational DBMS has taken a toll in machine resources, adding more CPU cycles to the evening processing load. But Backus said that cost is well worth the benefits.

"That price tag is worth it to save our development time on the front end and our maintenance and redesign time in the future," Backus said.

Backus said Northwestern Mutual has only begun to experiment with Spectra, the end-user information access tool within Supra. "Our main mission was to get the guts of Supra up and running," he said. "My charter for the coming year is to get these tools out to our end users. We have to wrestle with the issue of whether to allow users to go after production data or a copy of that data. And there is no question that down the road all those user queries will impact performance. We just do not know how great that impact will be right now."

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Computerworld 11/4/85

NEWS

WORLD DIGEST
CW International News Network

PARIS — Matra Data Systems, the data processing branch of the French electronics and telecommunications group Matra, will soon bow out of the microcomputing arena, according to the company's new president, Charles Picasso. Picasso announced last Tuesday that the computing division plans to reorient all of its activities toward scientific computing, an area in which it has registered an annual growth of 20% to 30%.

MUNICH, West Germany — The growing importance of the personal computer in Europe's office automation market was reflected at the systems trade fair last week as several manufacturers, including Philips MV, Epson Corp., Victor Technologies, Inc. and Wang Laboratories, Inc. introduced new microcomputers.

Victor unveiled, for the first time anywhere, the V286, its first personal computer offering compatibility with IBM's Personal Computer AT. The V286 reportedly uses an Intel Corp. 80286 16-bit microprocessor and is being shown with 512K bytes of internal memory and a 40M-byte hard disk.

LONDON — Salaries in British data processing departments rose ahead of inflation for the 12 months ending in July, according to a recent report by a consulting firm. The average salary for a DP manager during that period was the equivalent of $26,963 (U.S.), up 9.6% from last year's figure of just over $24,562 (U.S.).

The highest paid DP managers now earn an average of $31,974 (U.S.). When adjusted for Britain's 8.8% inflation rate and company perks, total average salary for a British DP manager comes to nearly $27,846 (U.S.).

HONG KONG — Under its recently announced five-year plan, China said it intends to produce 400 million integrated circuits and 200,000 microcomputers by 1990. To meet that goal, China has begun a large-scale overhaul of its electronics industry, including the renovation of 2,000 electronics factories, according to the general manager of the China Electronics Import and Export Corp., Li Deguang.

Li, who spoke recently in a forum on penetrating the Chinese electronics market, said China hopes to import microcomputer production equipment as well as electronic test and communications equipment. The renovation of China's electronics factories, he said, should permit the country to achieve a sixfold to eightfold increase in the output of its electronics industry by the year 2000.

HONG KONG — Educational establishments, ship builders and a mining company in China have recently ordered computer-aided design systems worth more than $1.25 million (U.S.). The Chinese have also introduced a 32-bit, 24 million instructions per second AT&T Unix computer, the product of a joint development effort between China and Australian computer manufacturer Labtam International Pty. Ltd. The machine reportedly can run both Chinese and English software and will cost only 40% to 50% as much as its competitors.

MUNICH, West Germany — Siemens AG has recently announced upgrades of its PC-MX4 and PC-2000 microcomputers. The new micros are based on the National Semiconductor Corp. 32016 processor and support up to 16 users. The machines use Sinix operating software, an AT&T Unix relative, which allows them to be compatible with each other and with such older products as the PC-X and PC-MX.

TOKYO — Toshiba Corp. has agreed to develop jointly, with Visa International of San Francisco, a multifunction smart card to be unveiled in mid-1987. The card, tentatively called the "super-smart card," will also work as a magnetized automatic teller machine card and will have 64K bits of memory, Toshiba said.

The card will be about the same size as a credit card, but on its back will be a flat, nine-number keyboard. The front of the battery-powered card will look the same as a current Visa card. The card's users will have to enter their personal identification codes to complete a transaction. The card will verify the user's identity, deduct the amount of the transaction from the appropriate account and record it in memory for later accounting.

PARIS — In a move aimed at increasing network capacity and promoting the French telecommunications industry's prestige, the French Postal and Telecommunications Administration lengthened France's 23 million telephone numbers last Friday to eight digits. The action was aimed at relieving pressure on a telecommunications network that was almost saturated in some regions, the administration reported.

Although France once had one of Europe's least developed telephone systems, today it boasts one of the highest per-capita rates of telephone installations.

FRANKFURT — The market potential for information and communications technologies in West Germany still remains largely untapped, according to Gerd Wigand, general manager of ZVEI, an electronics industry trade association. Manufacturing companies expect revenue to surge by 15% in 1985 and 1986, where a 14% overall growth rate has been reported for the first half of 1985, and orders increased 32.2%.

Despite growing unemployment in other industrial sectors, communications and electronics companies reported a 5.1% increase in staff during the first half of 1985. Nevertheless, many job openings remain unfilled because of a lack of computer training facilities and qualified candidates in West Germany.

OSLO — The president of IBM Norway, Eyolf Haug, announced on Oct. 16 an IBM plan to establish a scientific research center at the University of Bergen, in western Norway. The company will invest approximately $40 million (U.S.) in the center, which will be given to the university.

An IBM 3090 and peripherals, worth more than $12.5 million (U.S.), will be donated to the center. The center's processing power reportedly will then dwarf that held by other Scandinavian universities. The center will house 10 to 15 IBM international research staff members and 30 to 40 other employees.

MELBOURNE, Australia — A $500,000 computer system has been gathering dust for nine months because of a dispute about the ergonomics of the system between its user — a Melbourne hospital — and members of the hospital's union. The dispute is costing $70,000 a month in bureau fees alone. The hospital has spent more than $20,000 on ergonomic furniture, acoustic hoods for printers and wrist pads for operators in its attempts comply with union demands, yet the dispute is no closer to resolution.

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NEWS

Government DP centers hit hard by quake

By Ricardo Romo and Carlos Trujillo
Special to CW

MEXICO CITY (CWN) — Twenty thousand magnetic computer tapes, containing Mexican census data going back to 1960, were destroyed when back-to-back earthquakes rocked Mexico's capital city in September. The tapes contained vital information on Mexico's population, economy and housing situation.

The data processing centers of the Mexican government were among the hardest hit by the quakes, with a total of four mainframes, 17 minis and numerous disk storage libraries all destroyed.

All Sperry Corp. computers at the Mexican ministries of Commerce and Industrial Development and Planning and Budget were destroyed, a company spokesman reported.

The data center at the national bank of Mexico, Banamex, however, was one of the few largely unaffected by the disaster. Banamex attributed the survival of its DP shop to the fact that it is located in an underground, earthquake-proof and fireproof structure.

Though the quakes occurred Sept. 19 and 20, an assessment of the total destruction involved is only now being made as the last of the rubble is cleared. The damage to the city's data centers is estimated to be in the millions of dollars.

Among the hardest hit was the Mexican government's Ministry of Planning and Budget. Thirteen people died when the ministry's center for census data was leveled by the quakes. A Sperry 1100/80 mainframe, being rented by the planning agency, was also destroyed. Damages within that agency reportedly exceed a minimum of $2.5 million.

The census data center's tape library suffered the loss of magnetic tapes that held Mexico's Economic Census of 1982, its General Population and Housing Census of 1980 and population censuses for the 1970s and 1960s. It is not known whether backups of the tapes exist.

When the earthquakes struck, telephone and data transmission lines were severed. Computers responsible for managing data traffic shut down due to loss of power. For days, telex messages were the only means of communications still open.

The sudden loss of communications hit hard at Banamex, where Burroughs Corp. computers are linked with those at other banks throughout Mexico and the world. The national bank was cut off from the Society for Worldwide Interbank Financial Communications (SWIFT) network until replacement computers were brought up at Banamex headquarters. Data traffic from Banamex then traveled to other world banking centers, including banks in the U.S., via a connection between Banamex and a SWIFT network site in Madrid, the bank reported.

In the wake of the disaster, the Mexican branches of major U.S. computer vendors rushed to the assistance of their customers. IBM is said to have offered clients use of the mainframes at its Mexican center for scientific computing and to be providing consultation and damage evaluation. It has also reportedly sent to Mexico 30 tons of medical supplies, tools and power generating equipment.

Romo and Trujillo are contributors to the CW Network.

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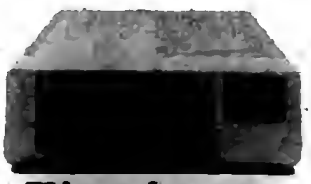

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TOP OF THE NEWS

Continued from page 1

tential for another Apple Computer vs. Steve Jobs-style clash. "We agreed at once that Allen and the others should leave the company immediately," said President and CEO Paul C. Ely Jr., who came to Convergent from HP last year.

Heading out the door with Michels were cofounder and Executive Vice-President Eliot G. Wegbreit, Corporate Vice-President for Business Development Matthew Sanders III, Vice-President of American sales Robert Van Naarden and Divisional Vice-President of Engineering Richard Lowenthal.

■

"Working on the frontiers of supercomputing," is the way one Cray Research source described the projects currently being pursued by two independent research teams within the Minneapolis-based firm. One team, headed by company founder Seymour Cray, has been working on a supercomputer to succeed the Cray-2 unit, which has recently begun delivery. The second team, under the direction of Senior Vice-President Steve S. Chen, will reportedly go beyond the mandate of Cray's group to "explore brand new architectures and technologies," said Cray Chairman John A. Rollwagen.

■

Corvus Systems, Inc. increased its stake in the local-area network business with the acquisition of Applied Intelligence, Inc., a privately held Mountain View, Calif., developer of the Personal Computer Network Operating System (PC/NOS). Terms were not disclosed. San Jose, Calif.-based Corvus will use PC/NOS software in its Omninet local-area network and in future local net products.

■

Microage Computer Stores tomorrow will launch a satellite network to link dealers, franchise headquarters and vendors for training, new product information, occasional interactive programs and discussions and other ventures the subscribers' imaginations may produce.

Some of the cost of the system is underwritten by manufacturers whose wares the computer stores carry and who have logged in to the schedule to broadcast product information as part of the deal. Among the companies supplying programming — and commercials — are IBM, Hewlett-Packard, AT&T Information Systems and Compaq Computer Corp.

The premier broadcast of Microage Communications Network is set to feature a live discussion titled "The Health of the Computer Industry: 1986," with a panel of analysts led by Stewart Alsop II and commentary by columnist John Dvorak.

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VIEWPOINT

EDITORIAL

The stress factor

After a typical uneventful day, you leave work at 5:30 p.m., hop in the car and drive placidly home to a nice, quiet dinner with your spouse and kids, enjoy a restful evening of leisure topped off by a good night's sleep. If you do, however, you are unlike the majority of your fellow DP/MIS professionals.

For many of you, an evening like the one described above is a pipe dream. Missing from it is the factor that has become a habitual and unwelcome intruder in your life: stress. A difficult concept to quantify, stress is nonetheless a real and dangerous outgrowth of the computer age. And for DP/MIS pros, it is a concept that has hit hard.

Although it is the rare worker, blue collar or white, who feels that his job is *not* pressure filled, data processing management — like top jobs in air traffic control or surgical medicine — is generally found near the top of every list of high-stress vocations. Caught in the backlog web with user demand escalating, top management demanding bottom-line results and technology changing faster and faster, the DP/MIS worker is intimately familiar with rocks and hard places. The picture is a grim one: Starting on page 53 of this week's issue of *Computerworld*, we explore it at great length, looking at the varied causes of DP stress and methods for coping with it.

Linked to a growing list of physical and emotional problems, stress can lower productivity and increase turnover as well as lead to alcoholism, drug abuse and suicide. Stress is becoming the target of many industrial psychologists, management consultants and corporate personnel specialists who have implemented programs to confront the situation head on. Unfortunately, the solutions tend to be perfunctory at best — Band-Aids on an open wound. Much more needs to be done, especially within the data center itself.

For DP executives and middle managers, the strain is worse than ever. Many feel the squeeze from top management above and from their staff below and simply don't know where to turn. Besides heart attacks, ulcers and high blood pressure, DP burnout is a common symptom. And a one-day seminar on stress management simply will not solve the problem.

Before stress can be treated, it must be recognized as an issue. As one DP manager told CW, "Stress is not a top priority issue here."

Given that attitude, it is unlikely that top corporate management will take up the fight against stress in DP/MIS of its own volition. Therefore, DP and human resources departments must join forces to call for the institution of on-going, in-house programs to handle the problems of stress. Beyond workshops and seminars, there must be regular group and one-on-one meetings to discuss the human issues of computing, and counseling should be made available to employees who desire it.

Of course, this just adds another stressful responsibility to the DP manager's growing pile. It may, however, turn out to be the most important issue of all.

LETTERS TO THE EDITOR

Creative journalism no excuse for inexperienced 'whiz kid'

The article, "Whiz kid, 22, runs Longman Group operation" [CW, Sept. 30], proves that "creative journalism" abounds, even in data processing publications.

The article, if properly written, would have stated that if you are unwilling to pay the salary of an experienced data processing professional, you will have incompetent strategic planning, system design, vendor negotiations, work load and time line planning, delegation and other skills of professional management.

The attempt to make this situation appear positive is amazing. Even more amazing is that the company would allow its name to be so widely publicized.

Richard R. Meyer
Milwaukee

Requirements definition technique misrepresented as system design

In the In Depth article, "A Fast Way To Define System Requirements" [CW, Oct. 7], the Western Institute of Software Engineering Corp.'s technique for Requirements Definition was misrepresented as our Business System Design technique.

It is in the Requirements Definition and Analysis that the information needs, functional needs and general characteristics of a system are defined. The categories of these needs were correctly identified as external functions, outputs and inputs; internal and reference data; internal functions; and general and future requirements.

The last step, Business System Design, takes these needs and defines the physical means of satisfying these needs. In the design phase, Wisdm is similar to Joint Application Design (JAD) in that Wisdm does define screens, reports and so on but is not restricted to transaction-oriented systems.

A second point that needs clarification is the difference between Wisdm and the rest of the techniques. Wisdm begins testing, via models, in its Requirements Definition and Analysis stage. The result is a tested and verified set of logical models of the system.

Timothy A. Merriam
Bellevue, Wash.

Debate over true relational purity clouds practical DBMS applications

In E. F. Codd's article, "Is your DBMS really relational?" [CW, Oct. 14], I wonder how long this debate over relational purity will continue.

If it smells like a duck, walks like a duck and acts like a duck, what difference does it make what lurks underneath? Codd labels a vendor suggestion to revert to nonrelational capabilities to boost performance as "an apology by the vendor . . . [indicating] the vendor has not done the work necessary for achieving good performance with the relational approach." This is unwarranted and, assumes that the vendor ought to adhere blindly to a standard of "relationality" that may satisfy the academic but will not benefit the customer.

The article may have at least one real benefit. Many DBMS selection committees spend countless hours debating the relational purity of competing systems without having the slightest notion of what difference it makes.

Codd's declaration of universal nonconformance now makes their task easier: because no products are truly relational, they can forget about this criterion and concentrate on whether the DBMS meets their real-world needs.

Lee Gruenfeld
Los Angeles

Big Eight accounting firms should stick to audits, not to MIS services

From reading the article about Price Waterhouse & Co. and the New Jersey Department of Motor Vehicles, "Users tie snags to Ideal, DBMS" [CW, Oct. 14], and the article about computer systems involved in bank failures, as told by Big Eight accounting firms, "Big Eight MIS services facing congressional scrutiny" [CW, Oct. 14], one thing is very clear.

Accounting firms should never be permitted to do anything besides auditing. It is clear that they are using the contacts that they make in their auditing work to help them sell services that they are absolutely unqualified to provide. Their clients buy these services in the hope of being audited less stringently. The result is disaster.

Alida Jatich
Chicago

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AT&T reaches out

Tools permit limited file exchange between 3B line and IBM mainframes

By Paul Hamerman
CW Staff

LINCROFT, N.J. — AT&T last week announced its first set of tools that enables an AT&T 3B computer to communicate with an IBM mainframe.

Included in a deluge of AT&T product announcements were two models of the 3B four communications products for the 3B line and a version of AT&T's Unix System V operating system

Crystal ball
Profile

IBM gives up SBS for 16% of MCI

By Bryan Milburn
CW Washington Bureau

WASHINGTON, D.C. — IBM last week initiated a major peak into telecommunications by selling its 60% ownership interest in Satellite Business Systems to MCI Communications Corp. in return for an immediate 16% stake in MCI, the second largest long-distance carrier. The agreement permits IBM to acquire up to 34% of MCI during the next 12 months and IBM indicated it will in-

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Standards/83

sonal financial crisis or job dissatisfaction Page 2.

Performing the murder of two Wang employees in El Salvador some compatriots are reassessing aspects of international business travel Page 4.

By Jeffry Stanton
CW Staff Contributor

SUNNYVALE, Calif. — Amdahl Corp. last week extended its supercomputer line both upward and downward by announcing two additional vector processors and with performance exceeding one billion floating-point operations per second.

With the introduction of Models 1400 and 1200, Amdahl's family of IBM-compatible vector processors built by Ja-

and roughly 40% the performance of Cray Research Inc.'s X/MP-1.

The top-of-the-line 1400 [illegible] reportedly exercises 1.14 Gflops, [illegible] paired with 512 Mflops for the [illegible] old 1200 and outperforms X/MP-1 by approximately 40%.

Each of the four Amdahl models runs the same software and can be upgraded in the field to the next larger system, according to the company.

Although the four machines [illegible] nearly identical machine cycle [illegible] the 1400 produces [illegible]

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VIEWPOINT

IBM net sets market dynamics

Will Token-Ring local net hit the jackpot or miss the mark?

By Amy Wohl
Special to CW

For two or three years now, seemingly forever, an ever-growing band of analysts, users and competitors has been waiting for IBM to drop its other shoe. They awaited the announcement of IBM's Token-Ring local-area network, and most of us wondered when — and sometimes, if — it would come.

In a world attuned to standards and the possibility for compatibility they seem to offer, there have been two local-area network standards for the last year or so: a secondary standard called Ethernet invented by Xerox Corp. with 100 or more players, some of them very large; and a primary standard, a blank slot filled with vague shadows and marked in large letters "reserved for IBM." The assumption was that anything IBM offered as its strategic local-area network product would be an automatic and immediate primary de facto standard.

WOHL STREET MINIJOURNAL

And this perception seems confirmed. On the day after IBM's Oct. 15 local-area network announcement, a number of major vendors jumped — if anything so carefully planned can be so spontaneous — onto the IBM bandwagon, giving the IBM product the immediate authority of an industry standard.

Other local-area net vendors are sure to follow, either changing their existing products to the IBM standard, offering bridges between their environments and IBM's or offering new IBM-compatible products. This will happen fairly quickly, too, since a detailed description of what IBM was thinking about planning to do has been publicly available for more than two years.

But the IBM announcement is much less than we had hoped for, nothing more than a very controlled environment to hook up IBM and IBM-compatible personal computers. No mention of whether or when IBM will add System/36s or other IBM products to the local-area network scheme. IBM turned away all questions on future Token-Ring local-area network connections with a polite, "We can't discuss unannounced products."

This is a peculiar omission, given the following:

- Local-area networks seem finally to have come of age. Customers are now ready to install local-area nets as a significant, strategic interconnection scheme, and they would prefer to buy from a few, large vendors with standard products — that is, products that will form broad coalitions of cooperating vendors and products around them, permitting the customer additional selections.
- Many customers prefer to buy all of their system from a single vendor. All includes everything from processors to workstations, from communications schemes to software. IBM seems to approve of, even strongly urge, this practice, but in the current state of affairs, it would be difficult to buy a whole system, installable now, from Big Blue.
- IBM is clearly a vendor of choice for many customers, and many of those customers have been waiting for an IBM local-area network solution that could include its entire system. The IBM Token-Ring announcement, as it currently reads, is not yet that solution.

But IBM customers can be patient souls, full of faith in their vendor. That's exactly what competitors fear. They are afraid now that IBM has filled the primary local-area network slot in the marketplace with an announced, partial solution, and they will be unable to sell their existing products.

During a previous time, there would have been rumbles of antitrust proceedings and murmurs of preannouncements. Note that this has not occurred. Instead, there is a rush to hop on the IBM bandwagon, to offer compatible products and to attempt to get a reasonable share of the huge market IBM is expected to establish.

You could call this the "Personal Computer Effect." Vendors with fond memories of 1982 and 1983 hope to make their fortunes by establishing beachheads in markets assured of health and stability by IBM's role as a standard setter. In an orderly market, there is plenty of room for the niche players.

We call it the "Imprimatur Effect." IBM places its stamp of approval on a hitherto risky market, tells the players what its preliminary position will be and gives the market a takeoff point. Remember 1976 and display-based word processors? Or 1981 and personal computers for business? Note that IBM doesn't always get to be the initial primary player — that depends on the market reaction to its product.

In 1976, for instance, IBM announced the OS 6, its first dedicated, display-based word processing system. Other vendors were already selling display technology, but the predominant technology was still nondisplay based. IBM established the market, which immediately and explosively took off, but it failed to have an adequate product of its own until its announcement of the very successful Displaywriter product in mid-1980.

> ”
>
> *Local net companies are licking their chops, hoping that IBM has again misguessed the market.*

Contrast this with the Personal Computer market in 1981. IBM's stamp of approval not only established the business micro market, it became the primary player with the hottest product.

So where does the IBM local-area network fit into the scheme of things?

The users are anxious to get started now. IBM may have underestimated the urgency of that need — or they may simply be unprepared to exploit it. The outcome is difficult to estimate. If IBM announces big chunks of the rest of the local-area net announcement soon, that could be good enough to give it the lion's share of this market.

If it takes much longer or if the next pieces are perceived as unexciting and partial, IBM could be looking at 1976 all over again. The customers may just think that giving birth to a mouse — or even two or three mice, one at a time — just wasn't worth that elephant-size waiting period.

In that case, you will want to look for the next Wang Laboratories because it was IBM's failure to bring a display-based word processor to the marketplace on a timely basis that gave Wang its marketing window and created a $2 billion company. Local-area net companies are licking their chops this week, hoping that IBM has again misguessed the market — and that their opportunity lies in a giant company's inability to apply quick corrections.

On the other hand, IBM may know its customers and the market all too well. If customers are now ready only to plan for local nets installing cable, controllers and small systems, while thinking about and planning for larger ones later . . . well then, IBM has done exactly the right thing. It has given its customers what they need. It has established an orderly market where other players will need to follow its rules and will be at the mercy of its design changes and marketing plans. And it has an excellent chance to achieve the kind of market share big companies like.

Wohl is president of Wohl Associates in Bala-Cynwyd, Pa., and editor of "The Wohl Report on End-User Computing" newsletter.

Information, revolution and social justice

By Thomas W. Madron
Special to CW‡

Problems of social justice occurred in the American Revolution, the French Revolution and to even a greater extent in the Russian Revolution. The industrial revolution spawned generations of urban poor. So too, social justice is a potential problem in the information revolution. There is, unfortunately, little sense of the problem of justice among DP professionals.

Most of us who deal with computing, whether micros, minis or mainframes, are so caught up in the excitement of the technology and in the pressures of the job that we fail to think about the social impact of what we do or develop.

READER'S PLATFORM

In the U.S., at least, short-term inequalities are likely to arise from the movement away from an industrial economy to an information economy. This means that as old occupations are eliminated, segments of the population will be unable to move automatically from industrial work to information-based work.

Not everyone will be able to be retrained. Moreover, the developing information society may not be capable of absorbing a large supply of new workers as fast as they are being turned out. Retraining, therefore, is only a partial answer.

An instructive example of change in the workplace is the decline in membership of the typographers union. That is taking place because printing with hot lead is giving way to composition with computers and offset printing. This phenomenon is identical to what happened to scribes following Gutenberg's discovery of printing from movable type in the 15th century.

Inexpensive printing techniques put an entire profession out of business within a generation. Computers are doing the same thing to typographers today. These are direct examples of old information technologies giving way to new ones.

The information revolution that is developing may also worsen inequalities that have been characterized by certain societies, such as the separation of the rich and the poor. Where that separation is also associated with racial or ethnic differences, further injustices may arise.

For computer-based knowledge to become an extension of a human mind, that mind must at least have access to the technology. The poor will not immediately have such access, placing them at a further disadvantage.

The attention that professional organizations pay to these issues is one way to measure the information industry's concern for such inequalities. If we look at the programs of such organizations as the Data Processing Management Association, the Association of Computing Machinery or the Society for Information Management, we find a complete lack of concern. We also find a very uneven distribution of microcomputers in elementary and secondary schools and a lack of significant training for teachers.

What should make the last few years of the 20th century different from those of Great Britain or the U.S. in the industrial revolution is that we now understand the consequences of major social changes.

Knowing that we can observe and measure injustices, future generations will judge us on our willingness to bring about a revolution of justice. In the 1980s, it is not at all clear that the commitment to social justice exists as public policy.

Madron is manager of computer services at North Texas State University in Denton, Texas.

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MICROCOMPUTERS

SMALL TALK
Eric Bender
CW Senior Editor

Riding through the next wave

In end-user computing, "a new wave of technology is about to crash around our heads," information systems expert Michael Hammer warned late last month at the annual Hammer Forum in Boston. Faced with "the exhaustion of traditional metaphors and ideas," MIS staff must find new ways to ride the wave, Hammer maintained.

As desktop systems boasting multimillion instructions per second (MIPS) processors and multimegabyte internal memories approach, "What will we do with them?" Hammer asked. "You don't need a 5-MIPS machine to run [Lotus Development Corp.'s] 1-2-3," he said.

Hammer, president of Hammer & Co. in Cambridge, Mass., acknowledged that large corporations — "the dominant force today in personal computers" — have successfully absorbed hundreds of thousands of microcomputers during the past few years.

"Five years ago, everybody was in the state of original sin and ignorance," he commented. "There was no such thing as 'users' — they were all 'victims.'

"You don't have to acculturate people any more," he said. "A lot of the issues we've been struggling with for five years are over."

However, companies generally have concentrated on word processing and spreadsheets and should not overestimate their progress, Hammer emphasized. "Calling these systems personal computers is about as useful as calling a toaster an energy converter," he said. "What we ought to call these machines, to date, is spreadsheet machines.

"Some of those machines have been

Continued on page 27

Micro-CPU links vital

Lotus' Kapor stresses need for tighter integration

By Clinton Wilder

BOSTON — Tighter integration of microcomputer applications with mainframe data is a key element in future end-user computing, Lotus Development Corp. Chairman Mitchell Kapor told a group of MIS managers at the Hammer Forum late last month.

The continued popularity of programs such as Lotus' 1-2-3 will depend on how easily its users can interface with information on the corporate mainframe, Kapor said. "It will become possible to effectively incorporate real corporate data into the spreadsheet," he said.

Echoing a theme sounded by many industry principals and analysts in recent months, Kapor said that the future of business micros is directly tied to how well and how fast vendors can supply true multiuser, network and micro-to-mainframe solutions.

"Sharing real data on [micros] through a technological intermediary — that's what will win," he predicted. "No one wants to do anything on a terminal anymore. And the distinctions between micros, minis and mainframes will become more blurred. What will differentiate systems is not the processor [driving the computer] but the tasks that it is asked to perform."

> *'Sharing real data on [micros] through a technological intermediary — that's what will win.'*
>
> — Mitchell Kapor
> Lotus Development Corp.

Kapor said that Lotus will aggressively continue its development work in the micro-to-mainframe arena, as exemplified by its current strategic partnership with Cullinet Software, Inc. "We're taking a more active role in that intermediary step," he said. "We're working with other vendors [besides Cullinet] as well. We're not going into the mainframe software business, but file servers and network servers are very plausible candidates for our participation, either in-house or through partnerships."

Fielding several audience questions on site licensing, Kapor said that Lotus has taken steps toward more liberal pricing policies, such as volume discounts and site upgrades for large customers. But he reaffirmed his belief that unlimited site licens-

Continued on page 27

Tandy laptop features drive

Tandy Corp. has unveiled the Model 600, a $1,599 laptop based on a CMOS version of the Intel Corp. 8088 chip. The system features a 360K-byte 3½-in. floppy disk drive, an internal 300 bit/sec. modem and a built-in clock. The flip-up LCD display shows 80 char. by 16 lines. Memory is 32K bytes, expandable to 224K bytes for $399.95.

Microsoft Corp. Works software, stored in read-only memory, gives file management, data base, word processing, spreadsheet, calendar and telecommunications capabilities. The life of the built-in nicad battery is about 11 hours.

INSIDE

Information center managers warn of unrealistic user expectations/22

CXI introduces gateway connections for micro-to-mainframe access through local-area networks/26

NEW THIS WEEK

- Tandy introduces a portable disk drive for laptops
- Software Link enhances Lanlink
- Phoenix Computer Products bundles utilities

For more on these and other new products, see pp. 87-122.

INSTANT ANALYSIS

"In five years, some smart MBA is going to come along and say, 'Maybe we can put all of these applications on one big system.' "

— Mort Rosenthal of Corporate Software, quoting one personal computer coordinator

Sytek offers file/print server for IBM net

Designed for networks with 20 to 30 users

By Eric Bender

MOUNTAIN VIEW, Calif. — Sytek, Inc. has broadened its 6000 family of IBM PC Network-compatible products with the introduction of a high-end dedicated file/print server.

The new Model 6610 server "is designed for larger networks with 20 to 30 users or for data-intensive applications such as [computer-aided design or computer-aided engineering]," product manager Duane Bowman said. The number of users is limited primarily by disk storage, with users typically requiring 3M to 5M bytes, according to Bowman.

Currently, on most PC Networks, an IBM Personal Computer AT acts as network server, but its performance as a workstation degrades noticeably, Bowman said. "The more server functions the AT takes on, the worse the situation gets."

The new Sytek server, which carries a starting price of slightly more than $10,000, is scheduled for January delivery.

Based on an Intel Corp. 80186 running at 8 MHz, the server provides 75M bytes (unformatted) of disk storage. Average access time is 28 msec, compared with the AT's 45 msec, Bowman said. The server supports multiple printers.

An optional 60M-byte streaming tape drive handles backup and restore functions for each micro on the network. These functions can be accessed through very simple commands, Bowman said.

Other utilities support remote diagnostics, with the ability to run and modify diagnostic procedures from any micro on the net.

The Model 6610 supports IBM's PC-DOS 3.1 and Network Program and implements the IBM Netbios interface. With a new interface being developed by Sytek, the server will work on the IBM Token-Ring network when that becomes available.

The 6000 family also includes the 6050 Network Translator, introduced in July, which permits a micro network to expand up to 1,000 nodes over an area of up to three miles.

Future products will include gateway options, Bowman said. Additionally, he noted, asynchronous dial-in and dial-out functions are not currently supported on the PC Network.

Text aid bows for IBM micro

By Charles Babcock

NEW YORK — The Battelle Software Product Center of Columbus, Ohio, has put its Basis text retrieval system on a compact optical disk that can be used with an IBM Personal Computer.

Battelle is offering Microbasis in a form that includes large-capacity, read-only storage as a way to make large archival data bases easily transportable on nonsensitive media. Since a laser reading device does not touch the disk, dust and fingerprints will not harm the stored information, according to Michael McDonald, manager of the Basis Products Office in Columbus.

Continued on page 26

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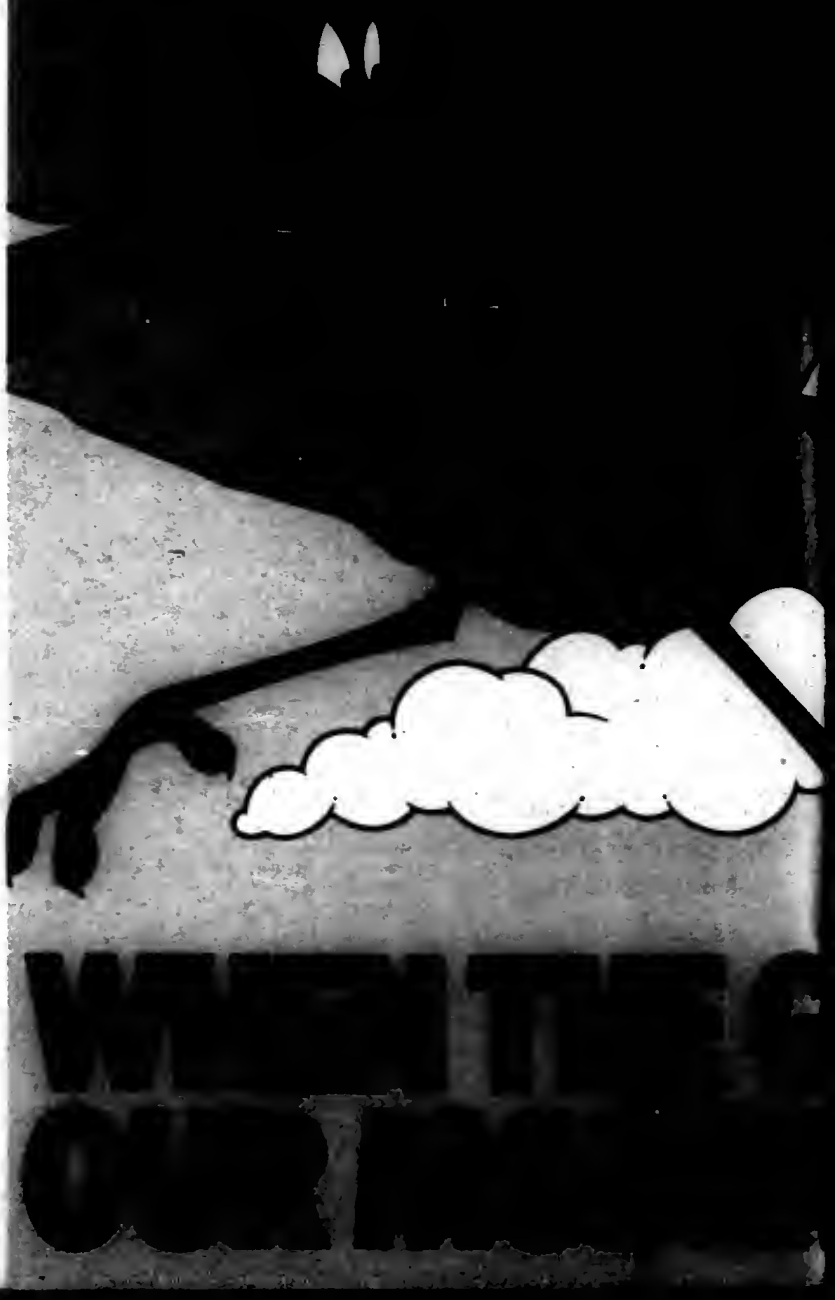

Users key to info center

Managers cite aims, ills on road to success

By Charles Babcock

NEW YORK — If you want to encounter the problems of training end users all at once, try instructing a group of medical doctors, advised Carmine Guiga, director of the information center at the Memorial Sloan-Kettering Cancer Center in New York.

"They have no time, little patience and big egos, but they like to fiddle with computers," Guiga told 200 listeners at a session titled "Information Center Strategies for Success" during the Info '85 conference in New York last month.

Guiga and others at the session cited many pitfalls that need to be skirted while focusing on the overall goal of increasing end-user self-sufficiency. There was agreement on the pitfalls but differences on how best to achieve that goal.

Shaku Atre, a Rye, N.Y., consultant on information centers, said, for example, that information center staffs should not get involved in developing applications.

But Jarunee Denniston, manager of a 3-year-old information center at Riggs National Bank in Washington, D.C., said that her staff successfully had developed applications for end users.

Guiga supervises four staff consultants in an information center at the cancer research center. The center caters to the doctors, scientists, middle managers, administrators and secretaries who are employed by the center.

Sloan-Kettering has 300 IBM Personal Computers in use connected to a host mainframe running IBM's Professional Office System. The information center is implementing Focus

Continued on page 27

AST memory board to come with Quarterdeck Desqview

By Peggy Watt

SANTA MONICA, Calif. — Quarterdeck Office Systems Co. and AST Research, Inc. of Monterey, Calif., have announced that Quarterdeck's multitasking operating environment Desqview will be included with every purchase of an AST Rampage memory expansion board.

Desqview takes advantage of Rampage's expanded memory capabilities, enabling more computer systems to integrate programs under Desqview, said Therese Myers, Quarterdeck president.

To run applications in more than several of Desqview's nine windows would otherwise require significant disk swapping or a hard disk drive, she said.

The Rampage board, announced in June, will include a coupon for Desqview in first shipments, which began last month.

The price is $495, and the board carries a two-year warranty. The systems run on IBM Personal Computers and compatibles, including the Personal Computer AT.

Younger sibling of Desq

Desqview is the younger sibling of Desq, a window management program developed by Quarterdeck last year before the appearance of such similar products as IBM's Topview, Microsoft Corp.'s Windows or Digital Research, Inc.'s Graphics Environment Manager.

However, Desq still got off to a slow start, blazing new integrated environment trails with like products from better known developers still on the horizon. Its price has dropped from $399 at introduction to $199 now.

Desqview, released in July, is priced at $99 and will accept all programs designed to run under Topview, with multitasking capabilities. It requires 128K bytes of random-access memory (RAM) and two floppy disk drives. Unlike the case with Desq, a hard disk is not required.

The Rampage board neatly sidesteps any need for further memory to run Desqview but offers the speed of hard disk drive access, said Tony Paradiso, AST senior product manager.

'Market just appearing'

"The market for these [expanded memory specification] products is just appearing," Paradiso said. He calls the Rampage technology a super-set of the Lotus Development Corp./Intel Corp./Microsoft expanded memory specification. The board uses paged memory to boost RAM capacity to 2M bytes for faster performance.

Myers also pointed out that a Desqview user can put Lotus' 1-2-3 or Symphony to work number crunching in the background while working with other applications in different windows, but the Lotus programs will not work in the shadows under Topview.

However, the user cannot split the 1-2-3 applications among several Desqview windows and must switch between them in one window.

Quarterdeck had always planned to do a "mini-Desq" program, Myers said. The evolution was established when IBM introduced Topview, and Desqview was written to be compatible with IBM Topview program interface files and run Topview-aware programs. It also features such Helpware features as easy access to DOS commands, an autodialer and macros as well as data transfer between windows.

Purchase of the $99 Desqview alone includes a coupon for $20 off on an enhanced memory board, including AST's, Myers said.

It is not the first bundling deal for AST; the company last April began bundling Sidekick, from Borland International of Scotts Valley, Calif., with its AST Six-Pak Plus.

Digital Research also recently announced it would modify its Concurrent PC-DOS to take advantage of AST's Rampage board extended memory capabilities.

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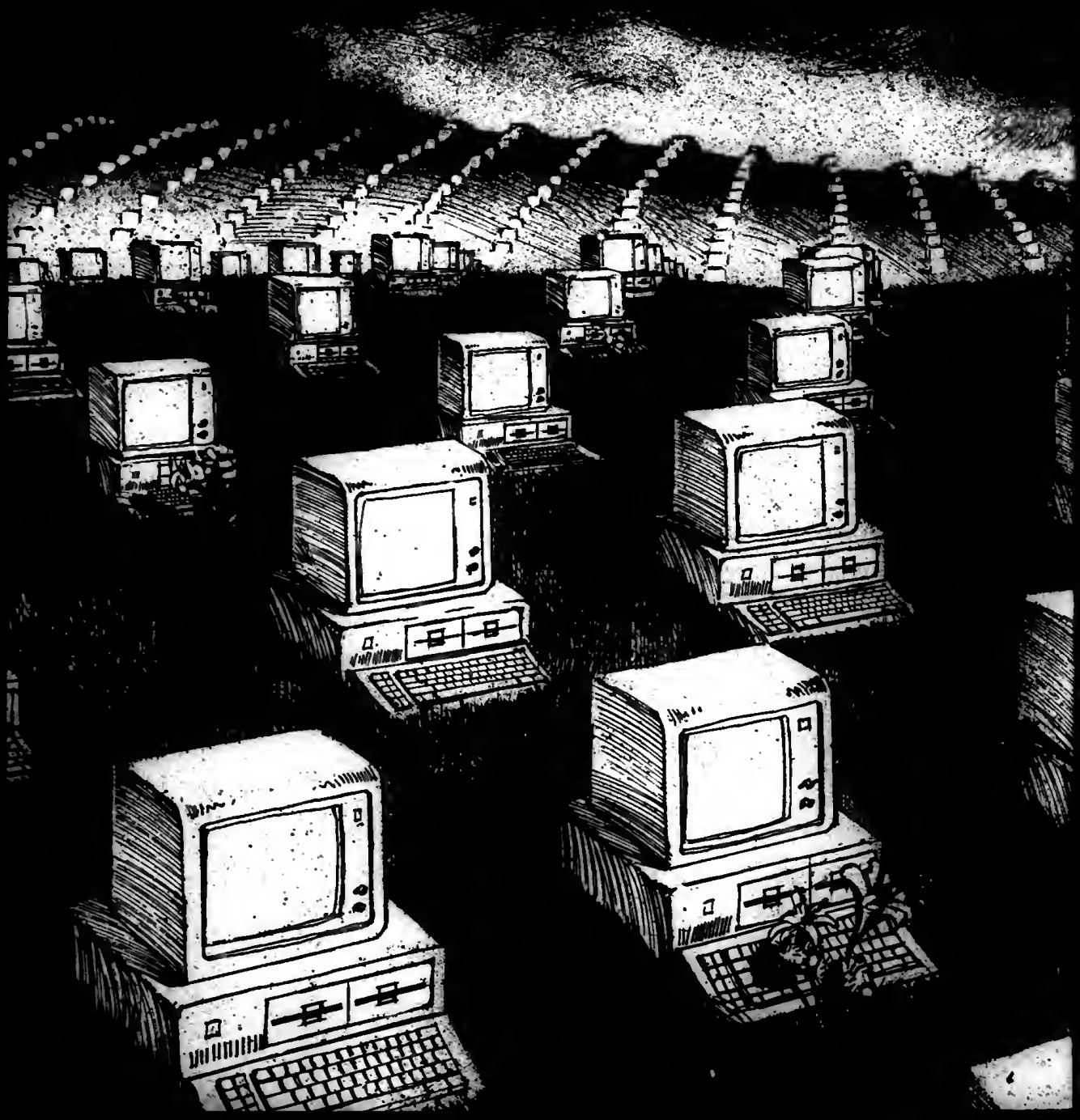

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From page 19

Text retrieval system out for IBM micro

Battelle is targeting publishers as an initial market for the device. Publishers would be able to send out large text data bases, 200,000 pages per disk, along with the Microbasis retrieval software on one 4.7-in. disk. Bookstore managers would need a laser disk reading system and an IBM Personal Computer or compatible to retrieve information, McDonald said.

Encyclopedia publishers, insurance companies and other users of large information data bases that change infrequently may be spurred to use the parent Basis software through the availability of Microbasis, officials said.

Microbasis is one of the few storage systems employing the rainbow-hued optical medium in conjunction with a microcomputer. There are few commercial uses of optical storage systems so far, McDonald conceded.

The retrieval software features a query language that provides instructions for directing the data management system. Records may be searched with a variety of key words, more than one key word or a combination of key words and numbers, McDonald said. In addition, documents may be retrieved by searching for key phrases or a word prefix or suffix.

The software includes reporting capabilities to enable users to present data in a variety of standard and custom formats.

In addition to running on the IBM Personal Computer and Microsoft Corp. MS-DOS compatibles, Microbasis can run under AT&T Unix-based systems and Digital Equipment Corp.'s Microvax under VMS. No price was announced for Microbasis, since the disks will be sold in conjunction with large data bases also placed on them.

Publishers whose distribution systems come to rely on the Microbasis disks may be spurred to buy the Basis software so that they can build the data bases themselves for dubbing on the disks, officials said. It sells for $15,200 to $38,000, depending on the size of the system, McDonald said.

Another recently introduced optical disk package running on a micro provides 3G bytes of character storage or 50G bytes of image data through a data compression system.

Advanced Graphic Applications, Inc. of New York, in a joint effort with the Cooper Union Research Foundation, developed a write once, read many times optical disk system for an IBM Personal Computer.

Priced at $31,000, the microcomputer-controlled storage and retrieval system, the Discus 1000, has the capacity to store two million pages of data, 50,000 scanned images up to 8½ by 11 in. each or 30,000 hours of speech recording, said Stanley Marder, executive vice-president of Advanced Graphic Applications.

Without the compression facility, Discus 1000 costs $21,500, he said.

The system is designed for users with a need for tamper-proof storage, such as insurance companies, legal offices or hospital X-ray sites, Marder said. The system uses a 12-in. optical disk in an Alcatel Thomson Gigadisc player. Alcatel Thomson is a French company with East Coast headquarters in Blackstone, Mass.

CXI gives IBM gateway links

CXI, Inc. of Palo Alto, Calif., has unwrapped micro-to-mainframe local-area network gateway connections.

CXI's 3270 Pcox/Gateway family has add-on boards and gateway software that resides in an IBM or compatible personal computer on a local-area network.

The systems serve as a gateway for that net to provide session service to computers on an IBM PC Network or compatible net.

The workstation software provides users with a choice of IBM 3278 and 3279 terminal emulation, 3278 and 3279 terminal emulation with 3287 printer support and IBM 3270 Personal Computer emulation.

Any of the 3270-PC host sessions can be configured as an IBM 3287 host-addressable printer.

The family includes the Pcox/Gateway Coax connection. This product includes Pcox/Gateway WS workstation software and user documentation for five IBM Personal Computers.

The $2,995 package will be available in January. Additional workstation software can be purchased at $275 per package.

The Pcox/Gateway-16 remote connection, available in January for $2,595, is said to provide local-area network workstations with remote access to up to 16 concurrent host sessions. It emulates a remote Systems Network Architecture/Synchronous Data Link Control (SNA/SDLC) or IBM Binary Synchronous Communications (BSC) 3274 cluster controller and links via synchronous modem to an IBM 3705, 3725 or equivalent controller.

The product includes the Pcox/Gateway WS software and user documentation for eight Personal Computers.

The Pcox/Gateway-64, available in February for $4,595, provides up to 64 concurrent host sessions.

This connection links via synchronous modem to an IBM 3705, 3725 or equivalent communications controller.

It emulates a remote SNA/SDLC or BSC 3274 cluster controller. Sixteen Pcox/Gateway WS workstation software packages and documentation are included.

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From page 22

Managers cite pitfalls to info center success

from Information Builders, Inc. and has a report writer, query language and a data base management package available to end users, he said.

"We are shooting to have 8,000 IBM [Personal Computers] on-line eventually," he said, but both he and later speakers said that too rapid expansion of information centers could prove their undoing.

"Use the striptease approach," Denniston advised. "Give [users] a little bit at a time so they can come back for more."

Guiga put it a different way: "Many centers offer good products and good training, but there's no follow-up. That's when the frustration sets in." He remarked that he has seen information centers fail — despite good managers — because they could not satisfy the expectations they had created for their end users.

Both Guiga and Denniston said that information center staff members can teach end users as fast as they want to learn, but that the staff should be wary of leading the users in deeper than they want to go.

Guiga cited the following examples of things an information center should not expect to do: eliminate the applications backlog; assemble a staff of frustrated MIS programmers who want to show end users how difficult it is to do what they request (the "it-serves-them-right" crew); or reduce customer service, since training coworkers to use computers will increase the demand for service.

An information center should not expect a staff consultant to serve more than 40 active users. Each user will tend to demand 45 minutes a week of the staff member's time, which will account for 30 hours, Atre said.

Guiga warned against assembling a staff that "speaks in four-letter words, such as VSAM and HSAM." End users will not be able to understand them, he emphasized.

Atre also said an information center should limit the applications software it makes available to users so that the center can be certain to support what it does offer.

Denniston and Guiga agreed that information center staffs need to gain expertise in networking to link personal computers to other personal computers and to mainframes. With networking facilities, it is much easier to satisfy end-user expectations of being able to get and share data.

From page 19

Kapor stresses need for tighter integration

ing contracts for micro software are not practical.

"The analogy I use is the pricing of coffee," Kapor said. "It doesn't make sense to buy coffee by the bean, which would be per-copy pricing for software, but a per-host policy would be selling all the coffee you want at a set price, which doesn't allow the vendor to earn a fair profit. I suspect both these extremes will regress toward the mean — coffee by the pound, which, in fact, is how coffee is sold."

The most exciting developments in micro software may come outside the office, he suggested.

"I have thought about an idea I call 'mom's information service,' " he said. "I think vendors will look at [personal computers] outside the corporation and consider the information needs of people in everyday life."

Asked if Lotus had another revolutionary product like 1-2-3 up its sleeve, Kapor said, "Lotus would be ill advised to assume another one like that."

From page 19

Riding through the next wave

out there for two years, and people are starting to get bored," he said. "Now the mating cry of the end-user is, 'What have you done for me lately?' "He added jokingly that "whoever taught end users to read did us a real disservice.

"You thought it was tough buying those 5,000 [personal computers]," he remarked. "What's it going to be like to replace them?"

Claiming that no one has a clear view of what is ahead, Hammer listed, tongue in cheek, the signs of an oncoming revolution.

Class-conscious end users

His list included palace intrigues among vendors; rising expectations and class consciousness among end users; a complacent bourgeoisie of computer dealers; an arrogant and effete aristocracy (the technocrats "who say, 'let them eat Macintoshes' "); intellectual ferment; a floundering economy; and meaningless reforms.

The revolution, Hammer went on, may take one of three Marxist forms.

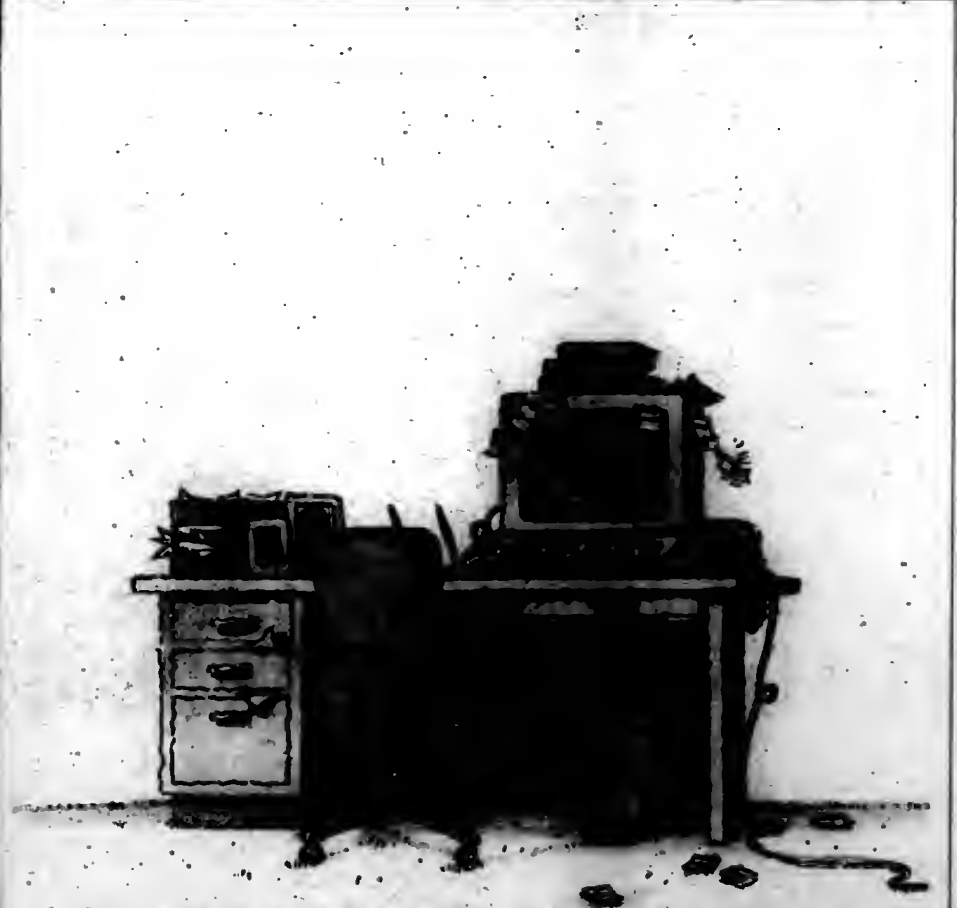
The Trotskyite model would be a permanent worldwide revolution, with personal computers becoming a standard appliance like a telephone, while a Stalinist approach would be a localized revolution, emphasizing development for existing power users.

A Maoist view would treat the personal computer simply as a small mainframe ("let's take the personal out of personal computer and talk about OCs — cheap computers").

Hammer's final view was an apocalyptic scenario in which everyone who needs a personal computer already has one.

"This is a bit of a chilling thought, but we need to include it for the sake of intellectual honesty," he remarked.

And which view will triumph? "The answer that we can be sure of is that we don't know," Hammer concluded.



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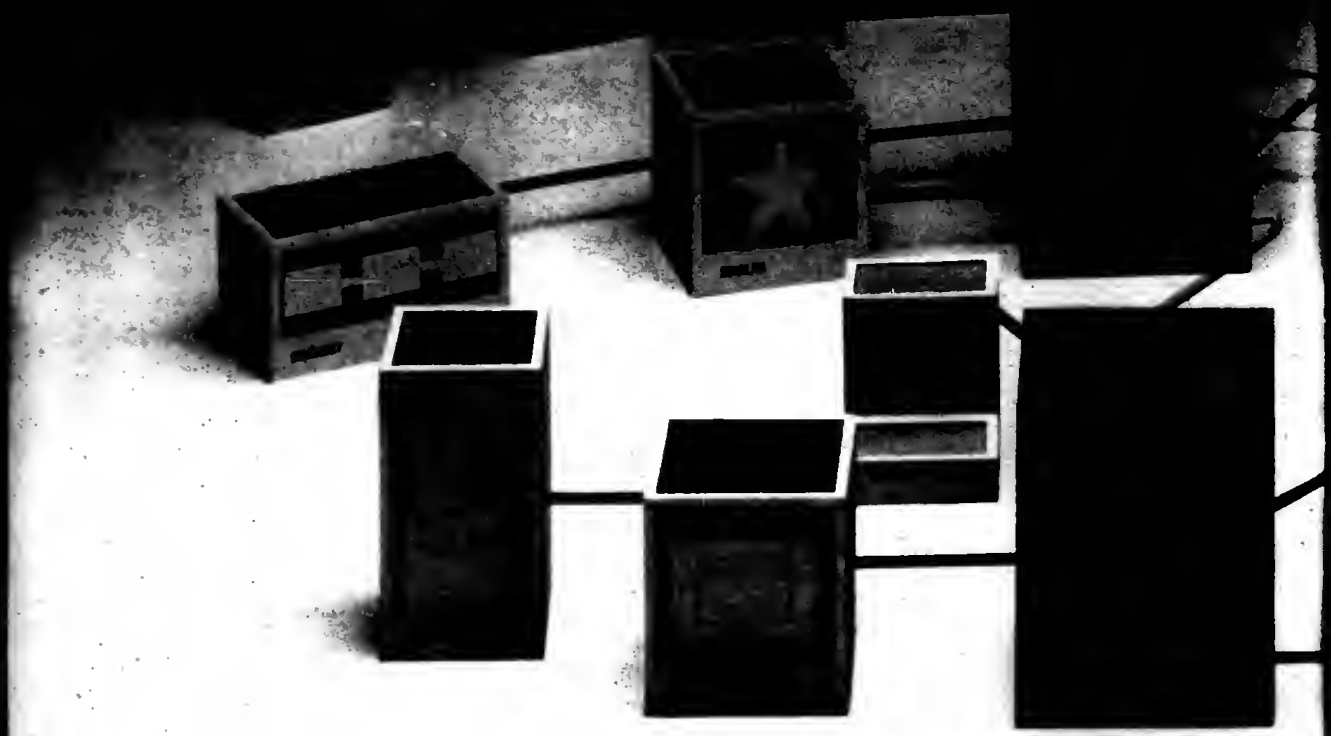

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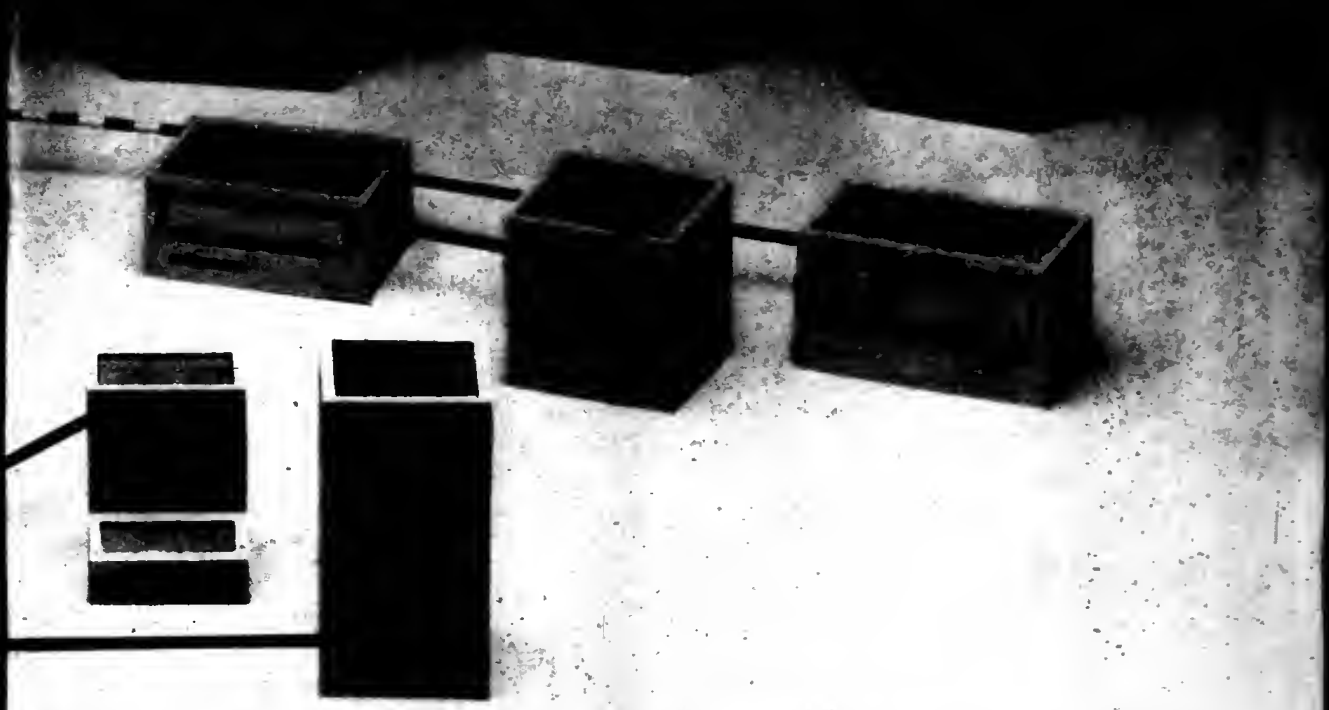

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SOFTALK
John Gallant
CW Senior Editor

Vendors ask: Make or buy?

Make vs. buy.

At a time when the make vs. buy debate has quieted somewhat in the user community, it is heating up, ironically, in the community of software vendors.

For years, essentially since IBM was forced to unbundle sales of hardware and software, independent vendors have been urging users to buy, not build, their software. Those vendors have been very successful in convincing users that buying packaged software is an acceptable, if not preferable, alternative to the increasingly costly task of developing custom systems. Witness the success that applications, data base management systems and systems software vendors have enjoyed in recent years.

But now those same vendors, most notably the largest software companies, are wrestling with a similar issue. Should they invest the time and money involved in bringing a software product to market? Or should they simply seek out a smaller vendor with, at least one hopes, a quality product or two and buy out the company?

Of late, a growing number of major software vendors have opted to go with the latter strategy.

Some notable examples: Martin Marietta Data Systems acquired Oxford Software Corp. and Mathematica Products Group, Inc. in the last two years. Computer Associates International, Inc. has acquired Sorcim Corp.; Johnson Systems, Inc.; Capex Corp.; Value Software, Inc.; Stuart P. Orr Associates, Inc.; and Information Unlimited Software since 1982. Uccel Corp. last month acquired Software Corporation of

Continued on page 32

Ada language on the move

Designer: Language's maintainability key feature

The message that Dr. Jean D. Ichbiah brings to DP managers is this: Ada has just now emerged as a viable and competitive language for applications development.

Ichbiah, one of the principal designers of the Ada language, led the team of software experts that won the competition in 1979 to develop a new standard language for the U.S. Department of Defense.

In 1980, Ichbiah founded Alsys, S.A. in France to develop Ada software products. The firm now has two subsidiaries, Alsys, Inc. in Waltham, Mass. and Alsys Ltd. in the UK.

During a recent visit to Washington, D.C., Ichbiah spoke with *Computerworld* correspondent Mitch Betts about the future of Ada.

INTERVIEW

Ichbiah: a principle designer of Ada

Is the Ada marketplace growing as quickly as you had first anticipated?

Yes, though the perspective of other people may be different because they overlooked the difficulty of [developing] compilers. But we at the heart of the Ada development process knew how long it would take to develop a solid technology. We were expecting it to take off right about now.

Ada compilers are quite elaborate programs. They do a lot to simplify the work of users. There are now more than 20 compilers on the market, some of them very good. For a computer language, compilers really are a starting point. People are now in a situation where they can deliver serious applications in Ada.

[Compare] the history of PL/I, which was defined in 1964.

The first compiler didn't appear until 1968, but, unfortunately, that compiler was not very good. It took until 1971, 1972 before you had a good PL/I compiler. By that time people had lost patience.

Continued on page 34

SOFTSCOPE

News from the industry front

AI — a better idea. **Ford Motor Co.** recently acquired an ownership interest in two of the leading artificial intelligence products companies — Los Angeles-based **Inference Corp.** and **Carnegie Group, Inc.** of Pittsburgh.

From Inference, which sells the Automated Reasoning Tool expert systems development environment, Ford will recieve knowledge engineering support for the building of expert sys-

Continued on page 34

Nixdorf expert system shell out

By James A. Martin

WALTHAM, Mass. — Nixdorf Computer Co. has announced an expert system shell for the MProlog language that runs on the IBM VM/CMS and Digital Equipment Corp. VAX/VMS operating systems.

The expert system shell, Twaice, was developed by Nixdorf through a joint venture with Logicware, Inc. of Wellesley, Mass. Twaice is said to offer a general mechanism for reasoning and documentation and a specific knowledge base incorporating the desired expert knowledge and data. Both are said to be totally interactive, functioning in the same shell, and require 4M bytes of main memory each.

Continued on page 34

INSIDE

Cincom Systems announces a conversion aid that lets users transport HP Image-based applications to Cincom's Ultra relational DBMS/32

NEW THIS WEEK

- Application Development Systems releases a full-screen version of Xpediter
- Goal Systems enhances its Explore/VM
- For more on these and other new products, see pp. 87-122.

INSTANT ANALYSIS

"In the next five years, we will probably see a large computer or aerospace company acquire a [major] software vendor. That strategic fit will change the scope and competitive nature of the industry."

— Brian Mutert
Robertson, Colman & Stephens

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Cincom conversion aid out for Ultra, Image DBMS

Cincom Systems, Inc. of Cincinnati has announced a conversion aid that allows users to transport applications written for Hewlett-Packard Co.'s Image data base management system to Cincom's Ultra relational DBMS on Digital Equipment Corp. VAX processors.

A spokeswoman said Cincom's Image conversion utility allows users to migrate their Image applications portfolio to VAX hardware. The Image conversion utility lets users maintain only one set of source code and enables them to use the performance of the Ultra relational DBMS on the VAX.

The utility is said to intercept automatically Image DBMS calls and translate them into Ultra calls, eliminating the task of redesigning I/Os, navigating file structures and maintaining two sets of source code.

Screen conversions are not handled by the utility, which converts Ultra status and error messages into Image return codes and messages, according to the vendor. Thus users can continue applications maintenance with Image terminology.

The utility is priced at $4,000 per copy.

From page 31

Vendors ask: Make or buy?

America, the ninth software firm it has acquired in little more than two years. Other examples abound.

For users, the issues behind the make vs. buy decisions are straightforward. Custom software usually — although it is certainly not guaranteed — meets user needs more closely than a packaged system and can provide unique and often vital functions that a more generic package does not. But a custom system generally takes a long time to develop and can be, overall, more expensive than a loosely fitting, but immediately available, packaged product.

What's behind the make vs. buy decision for vendors? "There are a lot of little companies that have been able to develop one or two good products. But they do not have the resources to expand beyond that, or they do not have the sales force to adequately market their products," said Brian Mutert, software analyst with Robertson, Colman & Stephens in San Francisco.

"Companies like Uccel and [Computer Associates International] gobble up these high-quality regional vendors to widen their customer base and to acquire more products with which to leverage their existing sales forces," Mutert continued. "In many cases, they can acquire some very key people in the process. There is also the issue of timeliness in entering a market with a product. Instead of developing something over three or four years, you buy an existing product and have an immediate presence in the market."

In addition, major software companies are often hamstrung by the width and success of their own product lines. The vendor's key development personnel begin to spend more and more of their time maintaining and enhancing existing products, rather than developing new systems.

IBM and applications mart

Perhaps the most important software vendor facing the make vs. buy decision is IBM. For years, analysts have been predicting that IBM will become a force in the applications market — a market it has, for the most part, conceded to the independents — by picking up an existing applications vendor. The impact of the industrywide slowdown has probably made more than a few such vendors willing to entertain the notion of being acquired. And that factor will no doubt lead to an increase in such acquisition activity in the coming months.

While the acquisition strategies of the software vendors may outwardly appear to be nothing more than the usual corporate machinations, they may have a dramatic impact on users. Perhaps the most challenging task facing a vendor that has acquired another software company is integrating the acquired party's package (or packages) into the vendor's own line of software. There's a great deal more involved in that process than simply redesigning screens and menus and rewriting documentation.

When a vendor chooses to develop a product, that product is designed from Day 1 to work with the vendor's other offerings. It may be more difficult, some would argue, to reshape an existing, disparate product to fit into an otherwise integrated line than it is to develop a new one from scratch.

Thus, users have to look carefully when considering the purchase of a newly acquired product — even if they are satisfied with the vendor's other offerings. Is the package truly integrated into the vendor's existing line, or has it simply been cosmetically altered to appear integrated? Did the vendor really reach down to the source code level and make the changes required to ensure true integration? Did the changes the vendor made impact the functionality or quality of that package?

At a time when users seem to have gotten a handle on their own make vs. buy dilemmas they are faced with a new problem. How do you deal with the vendor who has decided to buy rather than make?

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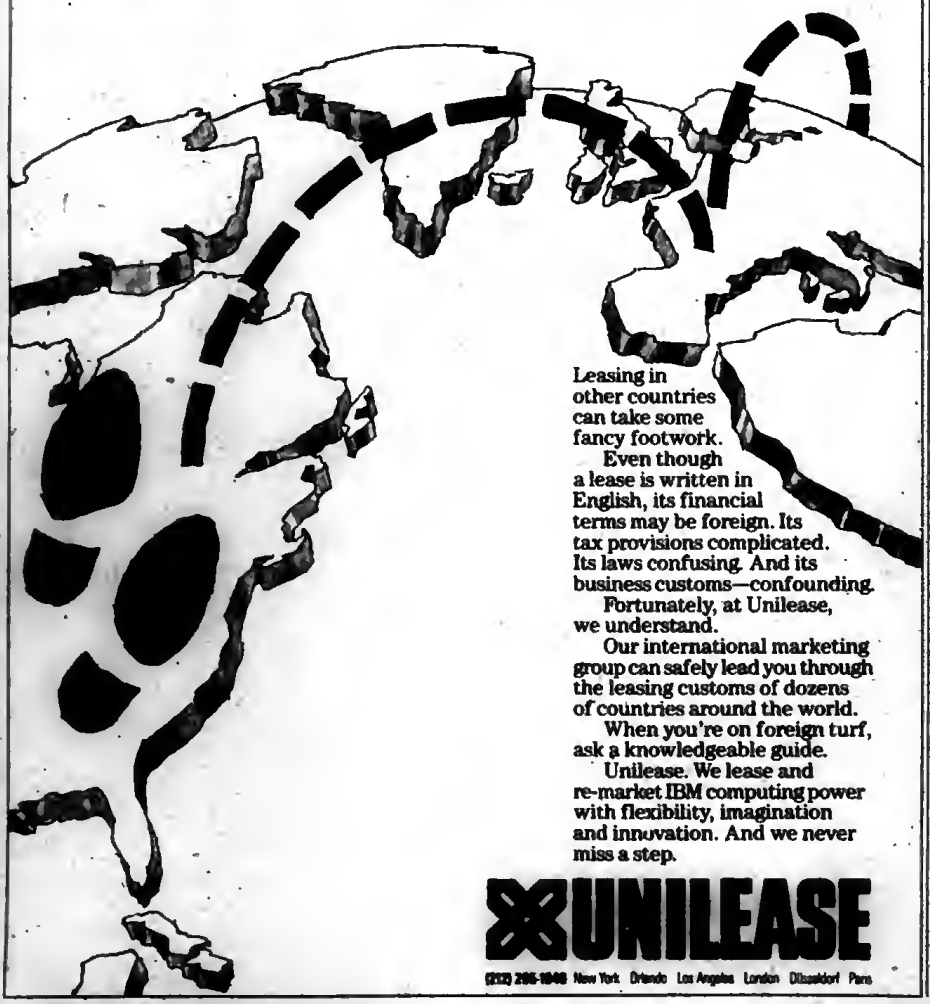

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From page 31

Ada language on the move

Your firm and others are developing Ada compilers for microcomputers such as the IBM Personal Computer AT. Why is that?

We are following the example of firms like [Microsoft Corp.] rather than traditional service-oriented firms. If you look at the software industry, where it's most vivid is in micro products. That is where you have the big numbers in terms of computer workstations, and therefore, if you want to succeed you have to be there.

Now that we have secured that, we also are developing [compilers] for mainframes, such as the IBM 370 architecture. They will be ready in the middle of next year.

Now that compilers are available, are there other obstacles to Ada development? For example, are there enough trained Ada programmers?

Our experience is that training programmers is not complex. So we don't see that as a barrier. Now that the compilers are there, it really depends on the Ada [vendors] to get it moving. They have to convince DP managers of the benefits, in terms of long-term maintainability, of their products.

When you talk to these managers, what's your best selling point for Ada?

It's maintainability, by far. Two years ago, much to our dismay, a survey of software firms indicated that they had not heard of Ada and that they planned to write their applications in C. Two years later, [a follow-up survey showed] the attitudes had changed radically. For one thing, they had heard of Ada. And, having used C, they were disappointed by it. C didn't induce programmers to [write] very regular code; they wound up with tricky code that is not very easy to maintain. The survey found a much more favorable attitude toward Ada because of the added maintainability it offered.

Are C and AT&T Unix the chief competitors for Ada?

Unix is not a competitor; it's an ally. C was seen as a competitor two years ago, in the absence of anything else. C was very much propelled by Unix. But more and more, Ada itself will be propelled by Unix. The availability of a number of good Ada implementations under Unix is likely to propel [the language] in the same way.

With the added qualities of Ada — maintainability and [modularity] — I predict Ada will be using Unix to make its way.

The masterpiece of the long-range DOD strategy on Ada has been the validation [requirement]. Forcing all compilers to go through a very stringent validation process is really the best guarantee for users that their programs will be portable. Everybody who has been using C has suffered from the difficulties inherent in its different implementations. That's not going to happen to Ada because of the very stringent validation requirements.

What is the most typical objection to Ada?

The reluctance to [abandon] a big investment in Cobol code. We have just reached the point where we confront companies with big investments in Cobol or C. The person who has a small program — for example, 20,000 lines — and is happy with assembler language, C or Cobol, would be difficult to convince. And why should we? The people who have very large problems, and who know they cannot continue to use the solutions of the past, are easier targets for us.

We intend to price [our Ada workstation compilers] very aggressively, close to the price of a standard Cobol compiler. We want to make these high-quality compilers affordable so that we can encourage DP managers and applications programmers to use Ada for small, experimental projects.

What is the significance of the recent decisions by the National Aeronautics and Space Administration and the Federal Aviation Administration to use Ada?

They are very significant. [Those agencies] are seeking to improve reliability, long-term viability and portability. They have the usual problems of large programs that have to be used for more than 20 years and which have to be reliable. This is a sign that, whereas Ada was put into orbit by DOD, it is starting to fly by itself, which is a sign of maturity.

How does the U.S. response to Ada compare with the European response?

The one difference I see is that when we do Ada seminars in France, we see in our attendance a higher proportion of DP managers . . . than we see in this country. In this country, we see more representatives from [computer-aided design and manufacturing], scientific and defense industries.

Has Ada become a personal crusade for you?

A very good test of the success of Ada will be when the day comes that people do not know who designed it; they've forgotten my name. The measure of the success of Fortran is that only the specialists know about [Fortran developer] John Backus. I see that day coming soon. I see more and more books about Ada that don't mention my name, and I see this as a very good sign that the language is progressing. I'm not disappointed; my objective is to see Ada succeed.

From page 31

Softscopes: News from the industry front

tems based on the environment. The $14 million corporate agreement, which gives Ford a 10% minority equity ownership position in Inference and a seat on the company's board of directors, also involves a transfer of Inference's AI and expert systems technology to Ford.

Ford's two contracts — totaling $14 million — with Carnegie Group will provide the Dearborn, Mich.-based automaker with AI expertise and knowledge-based software and a 10% equity in the company. Ford said the technology transfer will initially focus on the development of expert diagnostic systems for Ford's major divisions.

Ford will have immediate use of all Carnegie Group commercially available development environments, including Knowledge Craft and Language Craft. Ford joins Digital Equipment Corp., the French Generale de Service Informatique, Boeing Co. and Texas Instruments, Inc. as investors in Carnegie Group.

■

From the original. **Language Technology, Inc.**'s Recoder Cobol restructuring software for improving Cobol programs is now available through a three-year site licensing agreement. Previously, the service was available only to clients who brought their programs into the firm's Salem, Mass., headquarters for restructuring at a cost ranging from 20 to 50 cents per line of code. The license costs $150,000 for unlimited code restructuring. Recode Cobol, now in Version 4, runs in IBM VM and MVS environments.

Eric Bush, chairman and chief technical officer of Language Technology, said the license option is being offered for both marketing and technical reasons. "It's more convenient. Customers prefer to restructure on their own premises and at their leisure," he said. The licensing approach is beneficial to users with millions of lines of code to be restructured, he added.

■

Leading the leaders. Boston-based **Keane, Inc.** introduced a management education program — dubbed Project Manager Development Program (PMDP) — aimed at helping clients train project managers for large-scale applications development tasks.

PMDP was designed to instill in prospective project managers the "behavioral competencies" needed to manage complex DP projects. The service was positively received by its first client, the Customer Record Information Systems Division of Illinois Bell.

Using a "competency framework," PMDP reportedly helps clients select, hire and assign managers to projects that require their individual skills.

■

From page 31

Nixdorf unveils expert system

Twaice was described as a skeleton system that can be fleshed out with whatever knowledge base is selected, a spokesman said. It is said to be an evolution of Nixdorf's Faultfinder, Reppian and Conad expert systems.

Twaice was designed to "bridge the technology gap between MIS and AI," the spokesman said, allowing MIS users to access easily expert information using the MProlog language.

Twaice features

Features of Twaice include a taxonomy model for the knowledge base and the ability for interactive acquisition of taxonomic structures.

Also featured are a rule compiler for added speed at runtime and for taxonomic checks at compile time and explanation capabilities.

General lease for the expert system shell is $70,000, with availability in January.

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Managing the No. 2 resource

FIRST IN A THREE-PART SERIES

Next to having an intelligently designed network that uses the best possible technology, the second most important factor to ensure reliable and cost-effective communications is having the right people.

How can the communications manager or communications director obtain the best talent and retain such talent? What criteria should be applied to judge a potential candidate or an in-place work force?

Some factors that experience has shown to work well are described here and will be followed up in two subsequent columns.

In the case of an in-place work force, the listed criteria should be applied not on an individual basis but rather on a basis that identifies desirable skill development goals that then become part of yearly departmental objectives, along with standard hardware and software projects.

Technology is moving at a furious rate. The half-life of all technical data communications information is currently estimated at five years. There is a constant need to read trade literature, vendor brochures, conference proceedings and the like. The ideal candidate should indicate that he reads on a regular basis. Test that crucial habit by

Continued on page 36

Minoli is a member of the Bell Communications Research (Bellcore) network architecture planning group. Opinions in this column are strictly the author's and do not represent the view of Bellcore.

Pacific Telesis unit offers net management service

By John Dix

WALNUT CREEK, Calif. — Users with small to mid-size networks who are left cold by the idea of staffing up and installing equipment for network management may be interested in a new service from Pactel Spectrum Services.

Spectrum Services is a nonregulated business of the Pacific Telesis Group, the holding company formed by the AT&T divestiture that consists of Pacific Bell and Nevada Bell and nine other nonregulated businesses.

Formed in March, the company is marketing a net management service targeted at users with private networks consisting of six to 20 lines. From one of Spectrum Services' 14 planned Network Response Centers, the company can provide remote net monitoring and diagnostics, initiate and oversee network restoration and manage information about a customer's network, including details about vendor contracts and network configuration. Today, Spectrum has two centers, one in Irvine, Calif., and the other in Walnut Creek.

These centers monitor a customer's network by working in conjunction with a remote test computer installed at the host facility in each user's network. The test computer oversees the health of the network by interrogating loop-back test devices Spectrum Services installs at each of the user's network nodes. For the sake of security, customers can deny Spectrum remote access to the test computer until a problem arises.

The service accommodates all types of modems — they do not have to be diagnostic modems — and communications facilities, including two-wire dial-up and four-wire leased lines, multidrop lines, AT&T's Dataphone Digital Service, International Record Carriers and bypass facilities such as Digital Termination Services and small

Continued on page 37

IBM network compatibles out

By John Dix

Hoping to hitch their wagons to IBM, Ungermann-Bass, Inc. and Proteon, Inc. have announced local networks that are reputedly compatible with the mainframe maker's recently introduced Token-Ring network.

Ungermann-Bass is rounding out its Net/One product line with Net/One Token Ring, the first network offered by the company that does not use an Ethernet-type access method.

The Santa Clara, Calif.-based company has been working on token passing — the access method used by IBM — for two years, a spokeswoman said. Fruits of this development effort are reflected in products from both Ungermann-Bass and Industrial Networking, Inc., a company jointly owned by Ungermann-Bass (60%) and General Electric Co. (40%). Industrial Networking markets networks compatible with General Motors Corp.'s Manufacturing Automation Protocol.

Like the IBM network, the IEEE 802.5-compatible Net/One Token Ring is a 4M-bit/sec. baseband network that runs on the IBM Cabling System, including versions with either shielded or nonshielded twisted-pair wire. The Ungermann-Bass network supports the same number of devices as the IBM net: 260 when shielded twisted pair is used and 72 with nonshielded wire.

To create larger networks, Ungermann-Bass will provide bridges between ring segments, claiming it will offer the first bridge that supports the IEEE 802.5 specification.

While IBM's Token-Ring will initially support only Personal Computers, Ungermann-Bass reported it will provide a number of interface options, including a network interface unit for devices based on

Continued on page 36

INSIDE

A California Bank has reduced network downtime from two to three days to hours using a new net management service from Pactel Spectrum Services/37

NEW THIS WEEK

- TAB Products introduces three new modems
- Chipcom announces a family of broadband communications products

For more on these and other new products, see pp. 87-122.

INSTANT ANALYSIS

"I don't think we have anybody who understands [all of Systems Network Architecture]; I don't think we need to. As long as the pieces work together."

— Edward Sussenguth
IBM Fellow and former chief architect of SNA

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Oracle announces portable version of IBM SQL/DS and DB2

Any application written for IBM's SQL/DS or DB2 relational database management systems will now run without modification on DEC, DG, AT&T, HP and several other manufacturers' minis, and a wide range of micros, including the IBM PC/XT and PC/AT.

Oracle Corporation introduced the first relational DBMS in 1979. Today ORACLE is the only relational database management system that is completely compatible with IBM's SQL/DS and DB2. Programs written for SQL/DS or DB2 will run unmodified on ORACLE.

Originally designed for IBM mainframes and DEC superminis, ORACLE is now available on a wide range of machines, from mainframes to PCs. And ORACLE includes an integrated set of 4th generation software tools not available with either SQL/DS or DB2.

■ **Why not Cullinet, ADR or Focus?** There is a clearly defined standard for relational database systems. It's called SQL, and it's from IBM. Both ANSI and the US Government are in the process of adopting SQL as *the* standard database language. The Cullinet, ADR and FOCUS software packages each implement their own unique database language - each one painting the user into its own corner. Since its inception, Oracle Corporation has provided total IBM SQL compatibility.

Few shops nowadays run only IBM mainframes. Why, then, even consider a database solution that runs *only on IBM mainframes?* Applications written with ORACLE run identically on mainframes, minis, and PCs. Because all versions of ORACLE *are* identical.

FOCUS, Cullinet and ADR offer either a limited subset, a completely different product or nothing at all (respectively) for the PC. And none have minicomputer products.

■ **Why not just go with DB2 or SQL/DS?** A relational DBMS simplifies but does not by itself eliminate application programming. Additional tools are necessary if users are to create and maintain their own applications.

DB2 and SQL/DS are relational systems, period. ORACLE is a relational DBMS plus integrated 4th generation software tools for application generation, report writing, color graphics and network communications.

Furthermore, SQL/DS and DB2 run only on IBM mainframes (and are somewhat unlikely ever to run on another vendor's system). ORACLE runs on more IBM hardware and operating systems than do IBM's relational products.

■ **What about Goldengate, dBase III, Symphony or Framework?** PCs need more than PC software if they are to be usefully integrated with corporate data processing. Incompatibility with SQL, while serious, is not the only major problem with these micro packages. None provides an acceptable level of data security, integrity or recovery facilities. And their PC-to-mainframe links are functionally primitive and difficult to use.

To effectively link computers, all machines in the network should run the same software. Only ORACLE provides standard software on mainframes, minis and micros. Data and programs can then be shared among users of different machines, distributing the workload.

ORACLE is currently installed on over 1000 mainframe and supermini systems around the world, as well as on thousands of PCs. Oracle's customers include 8 out of the 10 largest U.S. corporations, as well as major foreign companies and government agencies.

For further information, contact Oracle Corp., Dept. C2, 2710 Sand Hill Rd., Menlo Park, CA 94025, or call 800-345-DBMS

From page 35

Managing the No. 2 resource

asking a few questions about recent developments that have made the major press publications.

Encourage the staff to subscribe to magazines and to share them. Set up a small practical library. Provide a few company-paid subscriptions.

Many trade magazines are free to qualified individuals. It is not unreasonable, however, to expect an employee to pay for one subscription out of his own pocket.

Above all, the manager should set the example. If the manager has moved away from the raw technology, then he should read resource management, financial-related or quality control publications.

It is not clear how a manager who is mostly in a decision-making area can continue to remain optimally valuable to his firm if he divorces himself from the technology that he is supposed to evaluate, recommend or maintain.

Coping with change

A few generations ago, one could get away with one-time training. Today, it is imperative that the individual's knowledge base be constantly replenished. Even when a certain technology branch may be relatively stable (for example, Cobol programming), the company's needs change, such as its expectations, strategies, products, profitability and even advertising campaigns.

The work force must be able to change with the firm's climate. Hence, the best candidate is not the one who knows A, B and C but the one who can quickly learn A, B and C. For example, it may not be important if the individual knows RS-449 but rather to consider how many modem interfaces he has successfully mastered in the past six months.

Sometimes communications managers seek an individual who has in-depth knowledge of many disparate areas. Such an individual may be hard to find, and a substantial monetary premium may be required. It may be better to find two individuals at a lower cost, each with a major and a minor field that complement each other.

Finally, when in need of a special candidate, don't just look at the people searching for a job. They represent only 15% of the total possible employee population. In fact, the best candidates may very well be those happy individuals who are already satisfied where they are. Many of these people can be contacted through colleagues, vendors, universities and conference speakers.

From page 35

IBM network compatibles debut

the Intel Corp. Multibus backplane.

A network starter system will include a Multibus interface, two- and eight-port net interface units, IBM Personal Computer interface units, Distributed Wiring Concentrators and a Ring-to-Ring Bridge.

With appropriate software, the Token Ring Intro/Net will cost $47,750, a speculative price as the company has not yet chosen the number of interface units to be included in that figure. The net will be made available in January to coincide with IBM's stated shipment schedule.

Proteon of Natick, Mass., was one step ahead of Ungermann-Bass in its quest to release an IBM-compatible network, because it already used the token-passing access scheme in two of its other net products.

The IEEE 802.5-compatible Pronet-4 is the lower speed brother of Proteon's Pronet-10 and Pronet-80, nets that operate at 10M and 80M bit/sec., respectively. Proteon will offer Pronet-4 host interfaces for processors based on Digital Equipment Corp.'s Unibus and Qbus, Motorola, Inc.'s VMEbus and Intel's Multibus. It will also provide an interface unit for IBM Personal Computers and compatibles.

The company said it would provide gateway products that would enable a Pronet-4 to be connected to higher speed Pronet products as well as to other network standards such as the IEEE 802.4 token-passing bus.

Proteon is scheduling the introduction of its Pronet-4 to coincide with IBM's first-quarter 1986 shipment date. A company spokesman estimated that Pronet-4 would cost between $1,900 and $2,500 per host node, including software.

Where graphics

It isn't that today's executives lack information. Far from it.

Fact is, they are deluged with information.

The problem, of course, is getting through it all. To get at those relevant facts executives need.

Fortunately, there is a solution. The Smart Desk equipped with an IBM graphics workstation.

This kind of Smart Desk lets the user look at easily understandable pictures—such as graphs, charts and diagrams—instead of thousands of words. As a result, executives spend less time making their way through data and more time making decisions.

What's more, with a Smart Desk with graphics capabilities the time executives save isn't only their own. For they can easily translate the information they need to share into charts, graphs and the like.

The IBM graphics Smart Desk not only makes it all possible, it makes it all painless. Even if the user never used a computer before.

There's an IBM graphics workstation ready to make almost any desk a Smart Desk. The IBM 3270 Personal Computer AT/G, for example, lets the user interact with the host computer or work in the stand-alone mode. With

The Smart Desk from IBM

From page 35

Pacific Telesis unit offers service

dish antenna satellite services. Speeds can range up to the 1.54M bit/sec. T1 rate.

When contracted, Spectrum Services takes a full inventory of the customer's network, including the names, serial numbers and manufacturers of all network devices; maps out the network topology; and gathers information about vendor contact names, maintenance contracts, circuit characteristics and protocols.

This data is entered into a relational data base management system maintained on a Digital Equipment Corp. VAX 8600 at one of the company's regional Network Response Centers.

Once the inventory is completed, Spectrum installs loop-back devices throughout the customer's network and a central test computer. Both pieces of hardware, which Spectrum owns, are manufactured by Datacomm Management Sciences, Inc. of East Norwalk, Conn.

In practice, the customer's test computer monitors the network by interacting with the remote loop-back devices. When preestablished thresholds are exceeded or a device fails, the test computer automatically dials Spectrum's remote Network Response Center. The VAX 8600 down-line loads diagnostic routines particular to the user's network.

Data gathered in this process is fed back to the VAX where operators diagnose and pinpoint the problem, typically within 15 minutes. Spectrum personnel call in the maintenance forces of the appropriate vendors and monitor the restoral procedure, keeping track of the elapsed time since the problem was reported.

Communication between remote loop-back devices and the customer's test computer requires use of the data channel, unlike most diagnostic modems, which use a side frequency band that does not interfere with data transmissions.

Because of this, the test computer has to take the circuit down when a problem occurs. According to company President Douglas W. Fagg, this interference is minimal.

The service for a two-host network with five or six lines serving approximately 170 sites would cost roughly $5,000 to $6,000 per month, Fagg said.

■

speak faster than words.

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Service saves bank time

The use of Pactel Spectrum Services has cut the time of network problem detection and correction at Mechanics Bank in Richmond, Calif., from two or three days down to hours, according to Tony Chavez, vice-president of data processing.

Mechanics Bank is one of two beta test sites for Spectrum's network management service targeted at small to medium-size network users.

Chavez said he is very satisfied with Spectrum Services. The use of this firm's service has ended arguments between the bank's circuit providers and its vendors of data communications equipment, finger pointing that often required days to sort out.

The bank has eight leased, multidrop circuits, each serving a specific application. One line serves the bank's automatic teller machines, hopping from branch to branch. Four circuits are used to support teller terminals, and three additional links support administrative terminals. In all, roughly 180 devices are supported.

Since Spectrum Services took over the bank's net management, the longest it has taken to fix a failure is six hours, Chavez said. The fastest network restoral was achieved in only two hours.

Chavez said the bank considered assuming the responsibility of net management itself but thought Spectrum Services would do a better job for the same amount of money. In-house management would have required the bank to hire a data communications expert and buy test equipment, whereas Spectrum Services already owned more comprehensive analysis tools than the bank could have afforded to buy.

An added benefit of the service, Chavez said, is the record-keeping capability. Over time, the bank will be able to weed out continually weak net links and fix them and pinpoint underused equipment.

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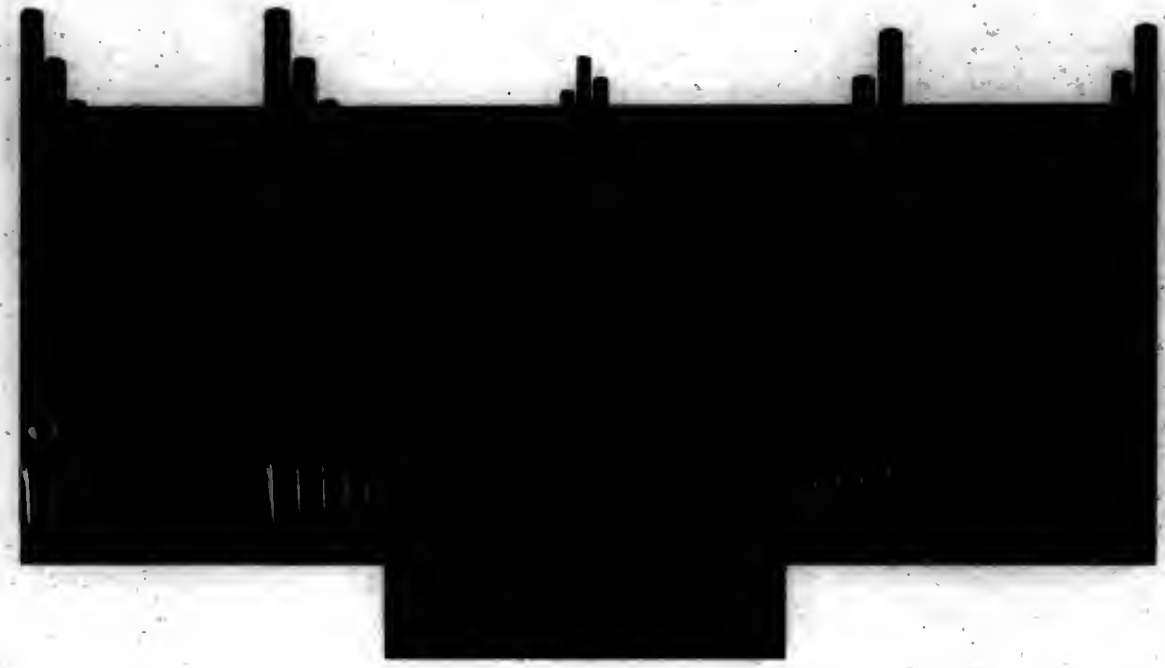

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HARD TALK
Donna Raimondi
CW Senior Writer

Knee-deep in hyperbole

I have spent the last couple of weeks trying to track down parallel minicomputers, the wunderkind that everybody is buzzing about. Well, it's mostly buzz.

Outside of a few university research centers and maybe one or two vendors, parallel processing is not commercially available. That fact, however, does not deter public relations flacks from claiming that their multiprocessor is a parallel processor.

The same is true of reduced instruction set computer (RISC) technology. True RISC embodies a set of principles that includes a very small instruction set — say 31 instructions — and a number of other specific attributes. In the morass of literature that the marketing hypsters heap upon us here at *Computerworld*, one would think that nine out of 10 new machines were RISC machines. Nothing could be further from the truth. The two companies — Pyramid Technology Corp. and Ridge Computers, Inc. — that come even a wee bit close to RISC have approximately 100 instructions in their instruction sets.

Software companies by the dozens claim to be enlightening the data processing world with artificial intelligence or expert system products, when in fact so few real ones exist that AI is essentially a product of the future.

Ditto fourth-generation languages and the phrases "IBM-compatible" and "user friendly." In extolling the virtues of its memory expansion boards, Orchid Technology Co. claims they "breathe new life into the personal computer."

Continued on page 44

Putting Cray-2 to net use

Unix-based supercomputer works as network node

By James Connolly

Supercomputers are no longer just back-end processors sitting helplessly without a supermini or mainframe preprocessor. Instead, as early users of the Cray Research, Inc. Cray-2 are proving, the high-powered systems can be used as nodes on local-area and wide-area networks working alongside microcomputers, superminis and other supercomputers.

Unlike its predecessors in Cray's product line, the Cray-2 uses AT&T Unix, so early installations at the National Aeronautics and Space Administration's Ames Research Center at Moffett Field, Calif., and at the University of Minnesota Supercomputer Institute in Minneapolis have placed Cray-2s on Ethernet, Network System Corp.'s Hyperchannel and the U.S. Defense Department's Advanced Research Projects Agency Network (ARPANET).

The goals at Ames and at the University of Minnesota are to establish supercomputer centers that can serve local users as well as users in the public and private sector tied in through national networks.

Managers at both facilities, where the systems have been undergoing diagnostics

Continued on page 40

The Cray-2 can perform 250 million continuous calculations per second.

Vector Automation units bow

Cadmax-100 series workstations expand offerings

By Donna Raimondi

A new series of workstations has joined Vector Automation, Inc.'s Cadmax family of computer-aided design and manufacturing systems.

Vector Automation of Baltimore said the Cadmax-100 series includes an entry-level Cadmax-110, the intermediate Cadmax-120 and the full-function Cadmax-130 model.

The series replaces the Cadmax-IIB and Cadmax-M systems.

All three workstations include Vector's proprietary software for design and drafting. Each configuration is field upgradable to the next level, and all may be intermixed within Cadmax's local-area network, according to the vendor. Each workstation features a 21-in., 4,096- by 4,096-pixel display.

The entry-level system includes a single processor with 1M byte of main memory, a 31M-byte fixed disk and a 2.5M-byte floppy disk. It costs $27,500.

The $37,900 dual-processor intermediate system includes a host processor and a terminal processor, each with 1M byte of memory, a 31M-byte fixed disk and a 2.5M-byte floppy disk.

The top-of-the-line model costs $46,800 and includes a dual-host processor and a terminal processor. Included with each is 1M byte of memory, a 62M-byte fixed disk, a 14.5M-byte tape cartridge and Cadmax's Bill of Materials software package, the vendor said.

INSIDE

Workstations based on IBM's Personal Computer AT and DEC's Microvax II superminis debut from GE's Calma division/40

NEW THIS WEEK

- DEC introduces its Packaged Automation System family of MicroPDP-11s
- Motorola unveils two supermicros
- Xerox announces a CAD system

For more on these and other new products, see pp. 87-122.

INSTANT ANALYSIS

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Culler Scientific Systems unwraps Culler 7 family

Units span supermini, supercomputer gap

By Donna Raimondi

SANTA BARBARA, Calif. — Culler Scientific Systems Corp. has unwrapped a family of six systems that is said to span the gap between superminicomputers and supercomputers.

The Culler 7 family ranges from a $250,000 low-end server for Sun Microsystems, Inc. networked workstations to a four-processor, $980,000 supercomputer. It is geared to scientific and engineering environments, particularly for modeling and simulation tasks.

The four high-end systems handle both scalar and vector tasks, a spokesman said. Million instructions per second (MIPS) and million floating-point operations per second (MFLOPS) ratings range from 7 MIPS, 2 MFLOPS for the entry-level machine to 36 MIPS, 16 MFLOPS for the top of the line.

Early products funded by government

Culler was founded 16 years ago by Glen Culler, who is said to be the father of array processing, according to a company spokesman. The company's early products — signal processing, speech processing and simulation engines — were funded largely by government agencies. A total of $16.3 million in funding for the Culler 7 line has been provided primarily by Adler & Co. and the F. Eberstadt & Co. investment firms in the past two years.

The Culler 7 architecture is said to capitalize on parallelism found in repetitive codes such as vectors and DO loops, the company said. The system employs a number of parallel computational resources that allow execution of several complete instructions within a machine clock cycle. Mathematical functions have been built into the hardware and firmware.

The company's CSD operating system is a version of University of California at Berkeley Unix 4.2 that has been enhanced, according to a spokesman.

System components

Components of the systems include a user processor, which is a 64-bit computational processor; a kernel processor dedicated to the operating system; a memory subsystem composed of kernel memory, global data memory, program memory and array memory; and two high-speed 64-bit system buses (a staging bus and a data bus) to connect all user processors and data memory.

Also included is an I/O storage subsystem, one disk and one tape, attached via a multibus. A system can have one to eight drives, and each drive has a 430M-byte capacity with an average access time of 18 msec. The tape is a dual-density 1,600/6.2K bit/in. streaming drive.

An Ethernet local-area network connection is standard on each model, and the system supports the Department of Defense's TCP/IP as well as its Advanced Research Projects Agency Network, File Transfer Protocol and Telnet. Two compilers — Fortran 77 and C — are available.

Between the low-end Model W and the high-end Model 40 are the $297,000 Model 5; the $397,000 Model 10 that includes a vectorizing compiler; the $575,000 dual-processor Model 20 and the triple-processor Model 30 that costs $855,000.

GE subsidiary rolls out design units for manufacturers

General Electric Co.'s Calma Co. subsidiary has introduced two design workstations based on IBM and Digital Equipment Corp. microcomputers and focused on the automotive, aerospace, electromechanical and general manufacturing markets.

The systems are intended to be production-worthy computer-aided design and manufacturing and computer-aided engineering (CAE) workstations that take advantage of hardware trends allowing for lower cost and higher performance, according to officials of the Milpitas, Calif.-based Calma.

Calma's Draftstation was designed as a low-cost two-dimensional drafting workstation. Based on the IBM Personal Computer AT, it is targeted to new users who need 2-D capability and to Calma's existing customer base for use as a complementary system with three-dimensional systems.

The Draftstation runs IBM PC-DOS 3.1 and can be operated on a stand-alone basis or in a local-area network. It consists of an IBM Personal Computer AT with 512K bytes of memory, a math coprocessor, a 20M-byte hard disk drive, a floppy disk drive, a 32-bit graphics processor capable of simultaneously displaying 16 colors, five expansion slots, a 19-in. monitor featuring 1,024- by 1,024-pixel resolution, an IBM-compatible keyboard and a tablet with stylus. The software was developed by GE. The Draftstation costs $27,450.

Calma also introduced a CAD/CAM/CAE system using a DEC Microvax II supermicro. The system, intended for use in mechanical, architectural, engineering and construction businesses, runs Calma's Design, Drafting and Manufacturing (DDM) and Dimension III architecture, engineering and construction software and Dynamics Research Corp. I-Deas 3-D mechanical engineering and design package.

The Microvax II system is an extension of Calma's DEC-based product line, which includes VAX-11/785-based systems. The product was designed to operate in an office environment as a network node for distributed CAD/CAM/CAE operations. It also operates as an entry-level, stand-alone system.

The Microvax II-based system supports up to three of Calma's GPS100 graphics stations, a product announced with the Microvax-based product. A standard configuration includes a Microvax II with 5M bytes of main memory, three of DEC's 71M-byte RD53 hard disk drives, a DEC TK50 95M-byte cartridge tape drive, an interface to DEC's Decnet and Ethernet, a DEC MicroVMS 4.1 license, a GPS100 station, a system console and a DDM software license. It costs $160,000 and will be available in the U.S. in November and in Europe and Asia during the first quarter of 1986.

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From page 39

Users put Cray-2 to network use

before going into production, reported that installations went smoothly last month.

At Ames, a four-processor Cray-2 with a memory capacity of 2G bytes was installed and will be a building block for NASA's Numerical Aerodynamic Simulation (NAS) project, which was planned as a national facility for computationally intensive research in areas such as aerothermodynamics, computational chemistry and atmospheric modeling.

NAS projects office manager Ron Bailey reported that the Cray-2 will be integrated with Amdahl Corp. 5840 mainframes, Digital Equipment Corp. VAX-11/780 superminis and Silicon Graphics, Inc. workstations on a national NASA network. Bailey said preliminary work such as installing Fortran code, system software and networking software is continuing and that the configuration, including remote links, should be completed by next summer.

Cray-2 set for development use

In Minneapolis, Supercomputer Institute Director Peter Patton said a uniprocessor Cray-2 is scheduled to be ready for full use as a development machine in early November. That machine, which had been used earlier as a development machine at the U.S. Department of Energy's Lawrence Livermore Laboratories in Livermore, Calif., until that laboratory received its permanent four-processor Cray-2, will be joined in December by a four-processor Cray-2 now being built by Cray as a production machine for the Supercomputer Institute.

In each case, the Cray-2s are being installed in temporary quarters while NASA and the university build new supercomputer center buildings.

For NASA, the new NAS project means "starting at ground zero," according to Bailey. The NAS Cray-2 is not replacing another supercomputer and has no existing configuration into which it fits. Like the university, NASA will partially finance the supercomputer project through usage fees paid by government agencies, private companies such as aircraft manufacturers and university researchers throughout the U.S.

For NASA, those fees would be for the use of the existing NASA Program Support Network, on which the

Continued on page 44

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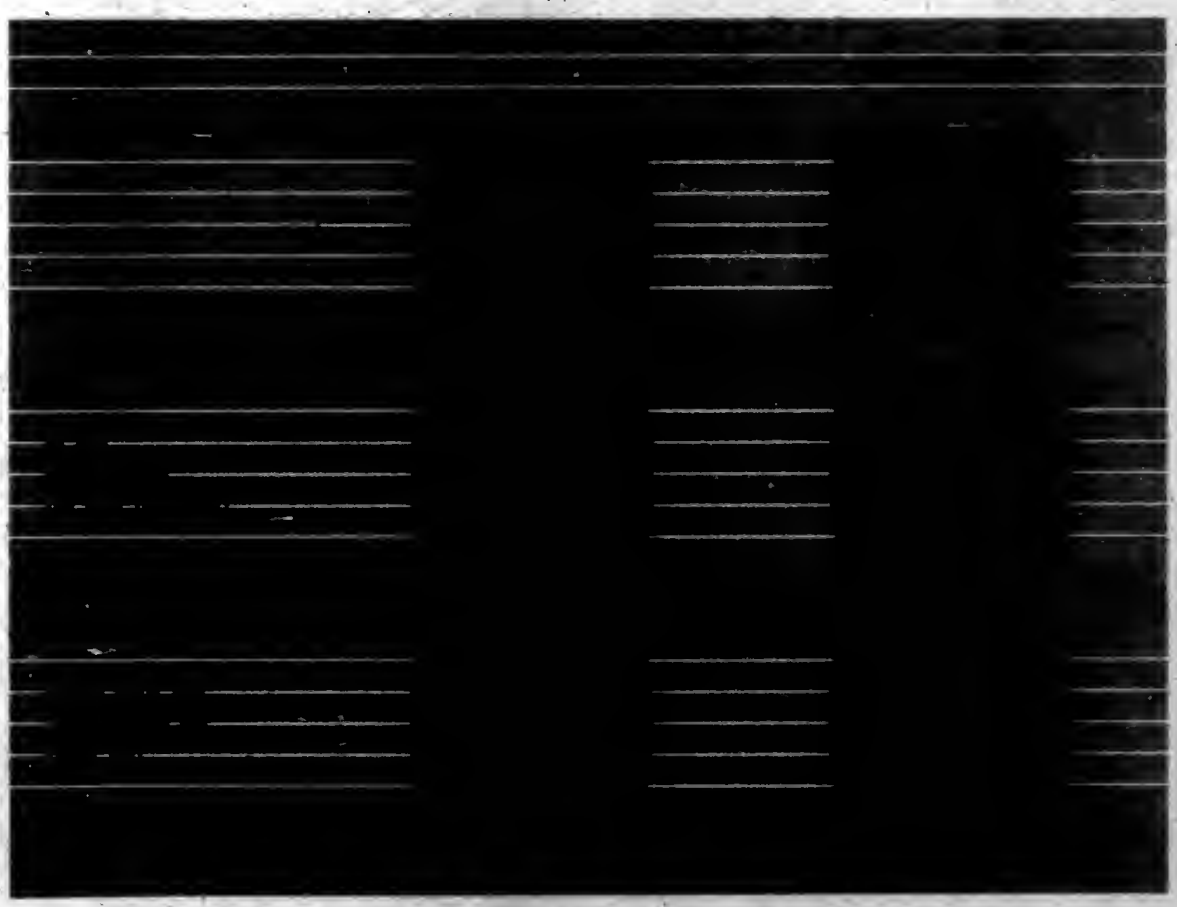

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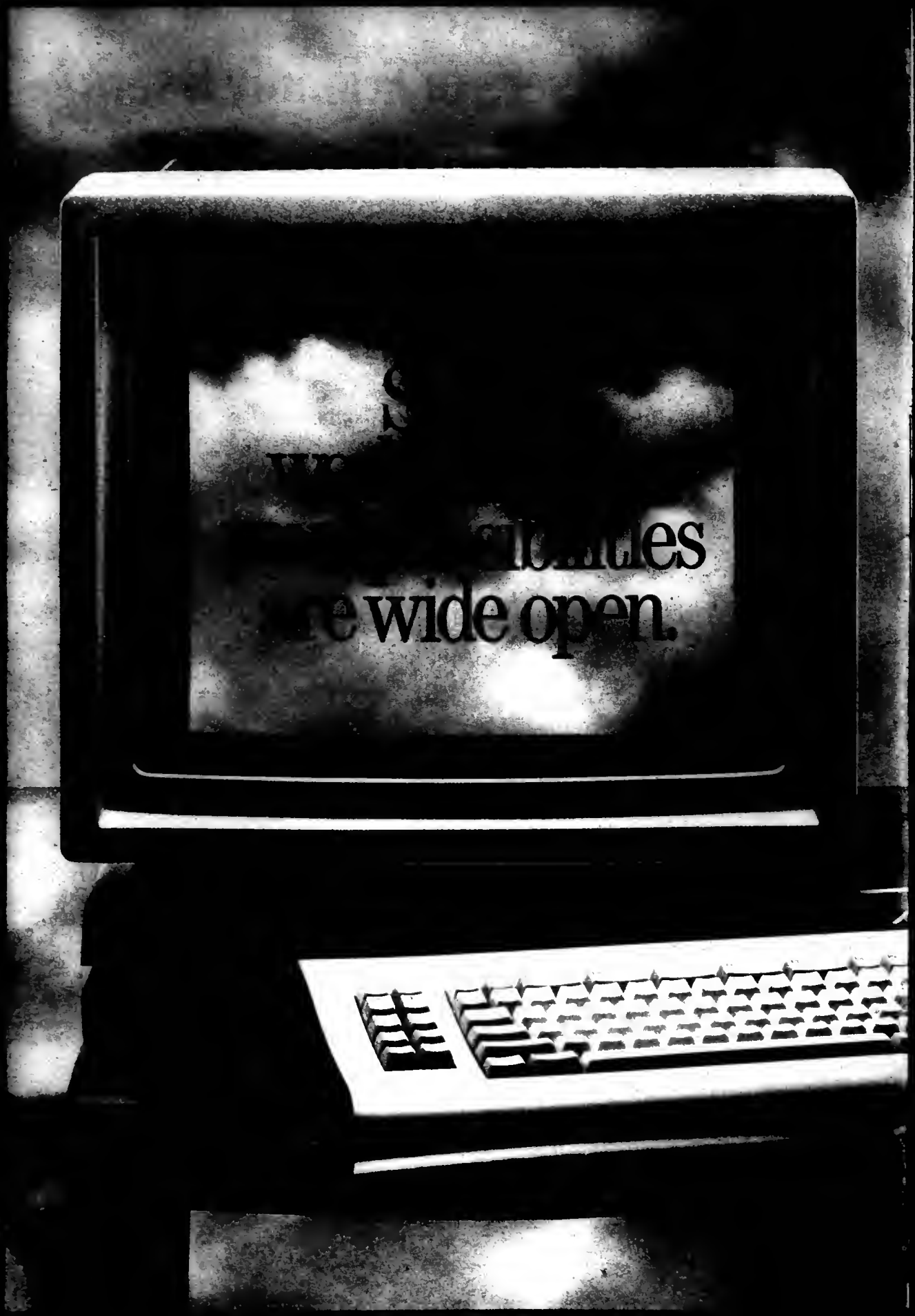
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From page 40

Users put Cray-2 to network use

Ames supercomputer will be one resource. In addition to the NAS project, NASA has several other supercomputers at Ames, which will be linked to the Cray-2 through gateways.

Bailey said the inclusion of Unix in the Cray-2 will best allow NASA to take advantage of the system.

"We set out our objective early on; we want to have a common user interface. We didn't want to have users jumping from one operating system to another, and we didn't want to get locked into one vendor," he said.

Access through ARPANET, Ethernet

Users on the NASA and Minnesota supercomputers will access the systems through ARPANET and Ethernet and using the Department of Defense TCP/IP.

While much of the massive quantities of data will be input through 9.6K bit/sec. communications lines or carried on ½-in. tape, the users will be able to run their applications by addressing the supercomputer as if it were any other device on the network.

Patton said, "The Cray-2 [represents] quite a different philosophy in computing in that it doesn't require a front end like the old supercomputers did because the Unix is fully interactive. So now the question arises of how much interactivity you want to support on a machine this large and this fast.

"So what we plan to do is to front end not in the environment sense like you would with an [IBM] 3084 or a [Control Data Corp.] Cyber 846, but in a communications multiplexing sense, where you have an array of VAX-11/750s with each VAX handling 16 to 32 users. The VAXs will handle the multiplexing and accounting and all of that kind of work, but they won't do job setups and file transfers. Those will all be done on the Cray," he said.

Patton said the 2G-byte (256-million-word) memory capacity on the Cray-2 due in December is so much more than that of the earlier Cray-1 that it eliminates the need for a front-end machine that "constantly worries about managing the memory banks."

"We've challenged our users to think of problems that can use the 256 million words on the Cray-2, and so far nobody has thought of anything that can use more than 40 million words of memory," Patton added.

Fluorocarbon cooling system

Patton and Bailey said the Cray-2's innovative fluorocarbon cooling system presented no problem during installation.

However, Patton did warn that opening the Cray-2 cabinet for even the few minutes required to replace a module causes a gallon of the volatile coolant to evaporate, at a cost of $400 per gallon.

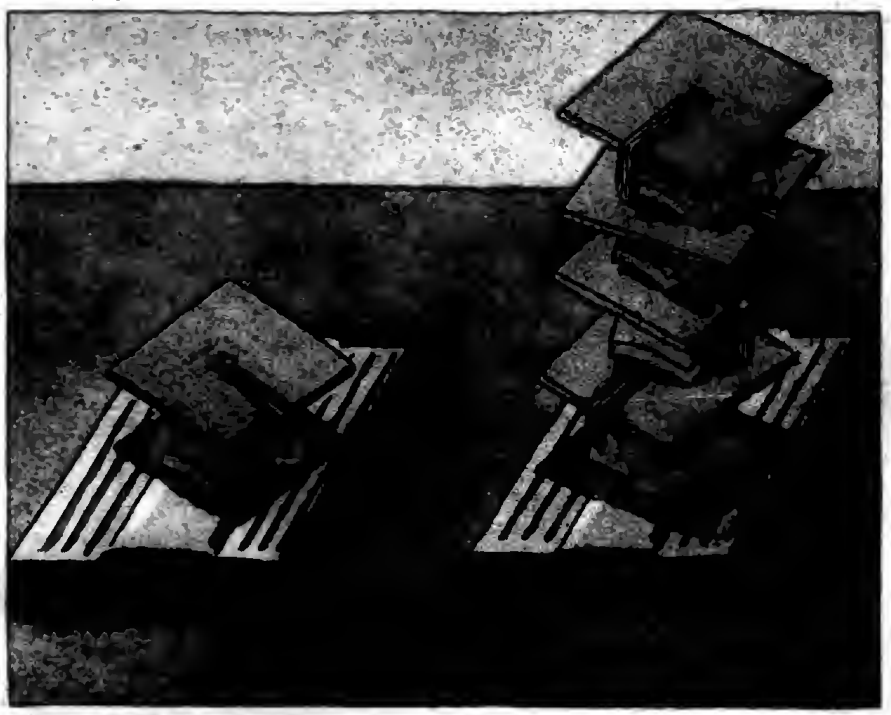
The institute is trading in a Cray-1 toward the cost of one of the Cray-2s and hopes to replace its ETA Systems, Inc. Cyber 205 with the expected next-generation ETA-10, while acquiring what is expected to be Cray's next processor, the Cray-3.

Challenge of running jobs in parallel

Patton said one challenge for the Minnesota researchers is to run jobs in parallel while presenting a single image to the user. He said he knows of only two universities — the University of Minnesota and the University of Illinois — working on that problem with four-processor Cray X-MPs or Cray-2s. He said Minnesota is the only early Cray-2 buyer interested in using Unix in parallel processing.

But Patton said of the institute's long-term plans, "Our goal is to establish computational science as a third branch of discovery alongside theoretical science and experimental science. We see this Cray-2 and the other supercomputers as offering the possibility of what John von Neumann foresaw as a mathematical laboratory in which we can frame experiments and test hypotheses.

"We are pushing into what we call computational science and computational engineering. It's possible now to do engineering design of systems on a scale where we have never done it before, to emulate several parts of some complex system at the same time."



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From page 39

Knee deep in hyperbole

Four out of five vendors claim that, for "the first time ever," a product that has several dozen peers is about to "revolutionize the marketplace."

The marketing hype almost obscures the fact that some of these products are good, some even excellent. It is difficult to separate fact from the public relations people's own special brand of fantasy, even within a company.

"Usually, when two technical people get together, like when I get together with one of my colleagues . . . then the [term] 'parallel computer' is ambiguous, because it has so many meanings that we don't [think of it] as having any semantic value," said Gary Feilland, director of advanced development at Sequent Computer Systems, Inc. "But in a marketing sense, people kind of make . . . a big deal about parallel or not parallel," he added.

From a user point of view, the terminology can be very misleading. A busy MIS manager who is trying to keep abreast of new technologies or the state of the art in a particular technology had better have a sturdy shovel to help him sort out what is real from what is, well, let's call it hyperbole.

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Financial service firm banks on DBMS to manage net

Supports data traffic among remote users

NEW YORK — Citibank NA is using relational data base management software to manage its private packet-switched telecommunications network, a system that supports data traffic between Citibank operations on six continents and provides customers and employees with access to bank services from remote terminals.

The DBMS had to meet several objectives, according to Walter Grifel, a Citibank vice-president. Among those requirements, he said, were the ability to determine how much traffic was on the network and where it was going, the ability to provide a breakdown of costs and usage in a way that meets Citibank's accounting needs and the ability to provide network managers with on-line access to the data base.

Citibank chose Logica Database Products, Inc.'s relational data base system, Rapport. It runs on a Prime Computer, Inc. 550 minicomputer at the bank network control center in New Jersey.

Grifel said that Rapport is used with on-line network usage data to analyze network utilization, the percentage of errors on lines and the availability of the network. The data base, he said, also provides reports that show these figures for all network components and can generate ad hoc reports on a user-request basis using its menu-driven report generator.

Application: Data base management system
Business: Financial services
User: Citibank NA

A complete inventory of network components and their relationships is also maintained.

Because of the complex and matrix-like relationship of the elements of the data base, a relational system was the best choice for a DBMS, Grifel said.

"The four most important reasons [why it was chosen] for the Citibank implementation were decreased time scales for implementation, availability of application development aids, ease of use of output reports and ad hoc report generation," Grifel explained.

No other packages investigated

No other relational DBMS packages were investigated prior to the purchase of Rapport, Grifel acknowledged, because there is "not much available for Prime [minis]" in that area.

Citibank estimated that the majority of the MIS implementation work was completed in three to four months and that development of an equivalent system using traditional methods would have taken more than a year.

He said he was satisfied with the software's flexibility of design and found that Rapport required only two, rather than three, files to be established when Citibank decided to add in extra security features. Three separate files would otherwise have required three different entries to update the system.

Grifel said that the firm liked the availability of such application development aids as a fourth-generation language that "dramatically diminished time scales for implementation." Other development aids used by Citibank with the DBMS include a screens package and a report writer.

Grifel said he expected time savings in system operation as well. This is because the fourth-generation language will allow Citibank MIS staff members to extract data and write special reports for themselves rather than have a specialist write a program for them.

"Because reports were able to be generated very soon after [the] implementation of the [DBMS] began," he noted, "they could be shown to eventual users and their comments and changes taken into account from an early stage in the data base design."

Ability to query the data base

Also appreciated was Rapport's ability to query the data base in unforeseen ways, Grifel said. Citibank, he said, specifically sought the capability to compose reports on new relationships between data on the system without affecting the structure of the data base.

The system's security, another plus, can protect the data sought down to the data base element level, rather than the usual file or record level, he said.

As an example of how Citibank plans to use the system, Grifel pointed to situations where users are finding congestion on a particular route at a particular time of day. The data base system could be used to generate reports to determine the source of the traffic and suitable alternate routes.

It could also be used for modeling alternative routing patterns to determine their effects.

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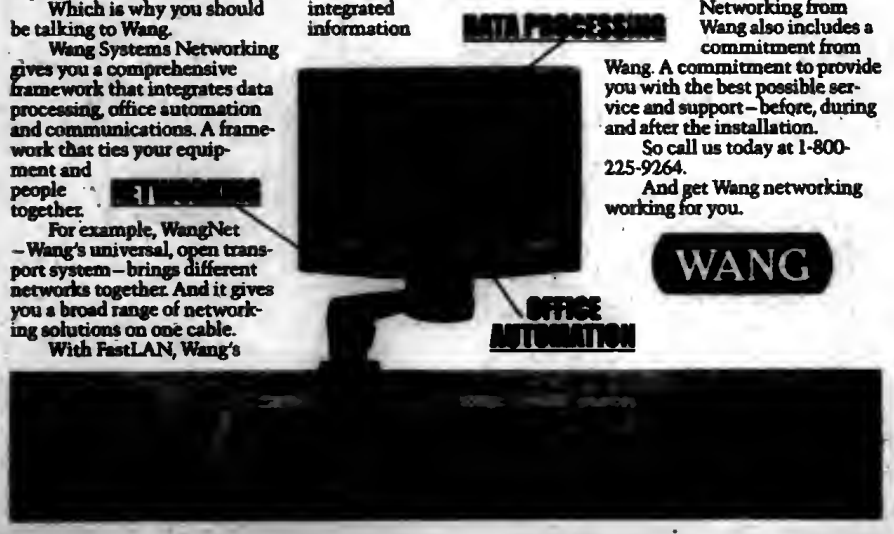

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NEWS

CALENDAR

WEEK OF NOVEMBER 10

NOVEMBER 11-13, ATLANTA — **Improving Computer Based Accounts Payable Systems.** Contact: Vern Lautner, American Management Association, 135 W. 50th St., New York, N.Y. 10020.

NOVEMBER 11-13, CINCINNATI — **Mainframe Networks.** Contact: Gloria Slyfield, Federation of NCR Corp. Users Groups, Mail Station SDC-2, Dayton, Ohio 45479.

NOVEMBER 11-13, WASHINGTON, D.C. — **Conference on Software Maintenance (CSM '85).** Contact: CSM '85, c/o Institute of Electrical and Electronics Engineers, Inc. Computer Society, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

NOVEMBER 11-15, SAN JOSE, CALIF. — **First International Conference on Computer Workstations.** Contact: Institute of Electrical and Electronics Engineers, Inc. Computer Society, West Coast Operations, 10662 Los Vaqueros Circle, Los Alamitos, Calif. 90720.

NOVEMBER 13-15, PHOENIX — **Long Range Information Systems Planning.** Contact: Vern Lautner, American Management Association, 135 W. 50th St., New York, N.Y. 10020.

WEEK OF NOVEMBER 17

NOVEMBER 18-19, BOSTON — **Software Tools Conference for Artificial Intelligence/Expert Systems.** Contact: Warren Briggs, Conference Chairman, Suffolk University, Boston, Mass. 02108.

NOVEMBER 18-19, SAN FRANCISCO — **Real Estate Investment Opportunities for Financial Institutions.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

NOVEMBER 18-22, ARLINGTON, VA. — **Tutorial Week Washington '85.** Contact: Martez A. Camilleri, Institute of Electrical and Electronics Engineers, Inc. Computer Society, 1730 Massachusetts Ave. N.W., Washington, D.C. 20036.

NOVEMBER 18-22, HOUSTON — **Structured Systems Design Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

NOVEMBER 18-22, SAN FRANCISCO — **Database Management Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

NOVEMBER 20, BOSTON — **T-1 Carrier Strategies.** Contact: DMW Group, Inc., Seminar Division, 2020 Hogback Road, Ann Arbor, Mich. 48104. Also being held Dec. 3 in Los Angeles.

NOVEMBER 20-21, ROSEMONT, ILL. — **Network Management/Technical Control.** Contact: Louise Myerow, Registration Manager, CW/Conference Management Group, 375 Cochituate Road, Framingham, Mass. 01701.

NOVEMBER 20-24, LAS VEGAS, NEV. — **Comdex/Fall '85.** Contact: The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

NOVEMBER 21-22, SAN FRANCISCO — **Import/Export Financing for the Small to Mid-Sized Bank.** Contact: Alice Gibons, Inter-Financial Association, 21 Tamal Vista Blvd., Corte Madera, Calif. 94925.

NOVEMBER 21-22, WASHINGTON, D.C. — **PC as a Programmer/Analyst Workstation.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

WEEK OF NOVEMBER 24

NOVEMBER 25-27, ATLANTA — **Strategic Analysis, Planning and Forecasting on the Personal Computer.** Contact: Vern Lautner, American Management Association, 135 W. 50th St., New York, N.Y. 10020.

NOVEMBER 29 - DECEMBER 1, PACIFIC GROVE, CALIF. — **Forth Modification Laboratory Conference.** Contact: Forth Interest Group, P.O. Box 8231, San Jose, Calif. 95155.

WEEK OF DECEMBER 1

DECEMBER 2-3, CHICAGO — **Application Prototyping: A Key to Successful Systems Development.** Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810.

DECEMBER 2-5, BURBANK, CALIF. — **IMS/ADF II Application Development.** Contact: IMS Consulting, Inc., Suite 305, 16601 Ventura Blvd., Encino, Calif. 91436.

DECEMBER 2-5, NEW ORLEANS — **Global Telecommunications Conference — Globecom '85.** Contact: Tommy Mayne, Globecom '85, Canal Place One, New Orleans, La. 70130.

DECEMBER 2-6, ATLANTA — **Structured Analysis & Design Techniques Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.

DECEMBER 2-6, NEW YORK — **CICS/VS Command Level Programming Course.** Contact: Bob Warwick, Branch Manager, Computer Assistance, Inc., 130 W. 37th St., New York, N.Y. 10018.

DECEMBER 2-6, WAKEFIELD, MASS. — **Tutorials for Professional Development.** Contact: Association for Computing Machinery, Tutorials for Professional Development, P.O. Box 9209, Church St. Station, New York, N.Y. 10249.

Continued on page 52

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Calendar

DECEMBER 2-6, WASHINGTON, D.C. — **Defense Computers and Graphics.** Contact: World Computer Graphics Association, Inc., Suite 399, 2033 M St. N.W., Washington, D.C. 20036.

DECEMBER 3-4, BATON ROUGE, LA. — **Bank Director's Seminar.** Contact: Peggy Meyer, Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

DECEMBER 3-5, NEW YORK — **Telemarketing/East.** Contact: Philip Carroll, Telemarketing East/West, Inc., P.O. Box 829, Arnold, Md. 21012.

DECEMBER 3-6, DALLAS — **North American Telecommunications Association (NATA) 1985 Convention & Exhibition Showcase.** Contact: NATA Convention Department, Suite 550, 2000 M St. N.W., Washington, D.C. 20036.

DECEMBER 3-6, NASHVILLE, TENN. — **ATMS, The Electronic Delivery Systems Conference.** Contact: Peggy Meyer, Bank Administration Institute, 60 Gould Center, Rolling Meadows, Ill. 60008.

DECEMBER 4-5, PALO ALTO, CALIF. — **California Computer Show.** Contact: Norm DeNardi Enterprises, Suite 204, 289 S. San Antonio Road, Los Altos, Calif. 94022.

DECEMBER 4-5, PHOENIX — **Arizona Electronics Expo.** Contact: Morgan-Grampian Expositions Group, 1050 Commonwealth Ave., Boston, Mass. 02215.

DECEMBER 5, DALLAS — **CDLA's Regional Reception.** Contact: Dianne L. Sims, Manager of Convention Planning, Computer Dealers and Lessors Association, Inc., 1212 Potomac St. N.W., Washington, D.C. 20007.

DECEMBER 5-6, BOSTON — **Local Area Networks.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 5-6, WEST PALM BEACH, FLA. — **Data Administration: Development and Practice.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 5-6, SAN FRANCISCO — **Integrating Voice and Data in the PBX.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521. Also being held Dec. 12-13 in New York.

DECEMBER 5-6, WASHINGTON, D.C. — **Introduction to Telecommunications Systems: Technologies and Applications.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

WEEK OF DECEMBER 8

DECEMBER 8-11, CHICAGO — **1985 Fall Industrial Engineering Conference.** Contact: Stephanie Starr, Institute of Industrial Engineers, 25 Technology Park/Atlanta, Norcross, Ga. 30092.

DECEMBER 9-10, DALLAS — **PC/MIS Managers Speak Out!** Contact: Ken Orton, Future Computing, Inc., 8111 LBJ Freeway, Dallas, Texas 75251.

DECEMBER 9-10, WEST PALM BEACH, FLA. — **How to Manage Data and Information as a Resource.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 9-11, SAN FRANCISCO — **Telecommunications Management.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 9-11, WASHINGTON, D.C. — **Financial Information Systems.** Contact: National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

DECEMBER 9-13, MIAMI BEACH, FLA. — **The 2nd Conference on Artificial Intelligence Applications.** Contact: Trade Associates, Inc., Exposition Management, Suite 200, 12250 Rockville Pike, Rockville, Md. 20852.

DECEMBER 9-13, LOS ANGELES — **Telecommunications and Communications Engineering Program.** Contact: University of California at Los Angeles Extension Department of Engineering and Science, P.O. Box 24901, Los Angeles, Calif. 90024.

DECEMBER 9-13, NEW YORK — **VTAM for Practitioners.** Contact: Judith Anderson, American Data Group, Inc., 3685 Woodberry Drive, Duluth, Ga. 30136.

DECEMBER 10-12, TOKYO — **Interface in Japan.** Contact: Peter B. Young or Linda M. Yogel, The Interface Group, Inc., 300 First Ave., Needham, Mass. 02194.

DECEMBER 11-13, ANAHEIM, CALIF. — **Dexpo West '85 — The Eighth National DEC-Compatible Exposition.** Contact: Carol Henderson, Expoconsul International, Inc., 55 Princeton-Hightstown Road, Princeton Junction, N.J. 08550.

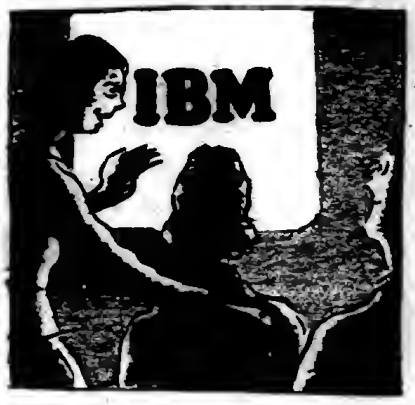
DECEMBER 11-13, WEST PALM BEACH, FLA. — **How to Build and Use a Data and Information Resource Directory.** Contact: Barnett Data Systems, 19 Orchard Way N., Rockville, Md. 20854.

DECEMBER 12-13, SAN FRANCISCO — **Financial Analysis for Telecommunications Equipment Acquisition.** Contact: Business Communications Review, 950 York Road, Hinsdale, Ill. 60521.

DECEMBER 12-13, DALLAS — **Troubleshooting the Data Communications Networks.** Contact: The American Institute, Carnegie Building, 55 Main St., Madison, N.J. 07940. Also being held Dec. 19-20 in Boston.

WEEK OF DECEMBER 15

DECEMBER 16-18, NEW YORK — **Data Analysis & Logical Design Workshop.** Contact: Elise Rabalais, Learmonth & Burchett Management Systems, Inc., Suite 405, 2800 N. Loop W., Houston, Texas 77092.



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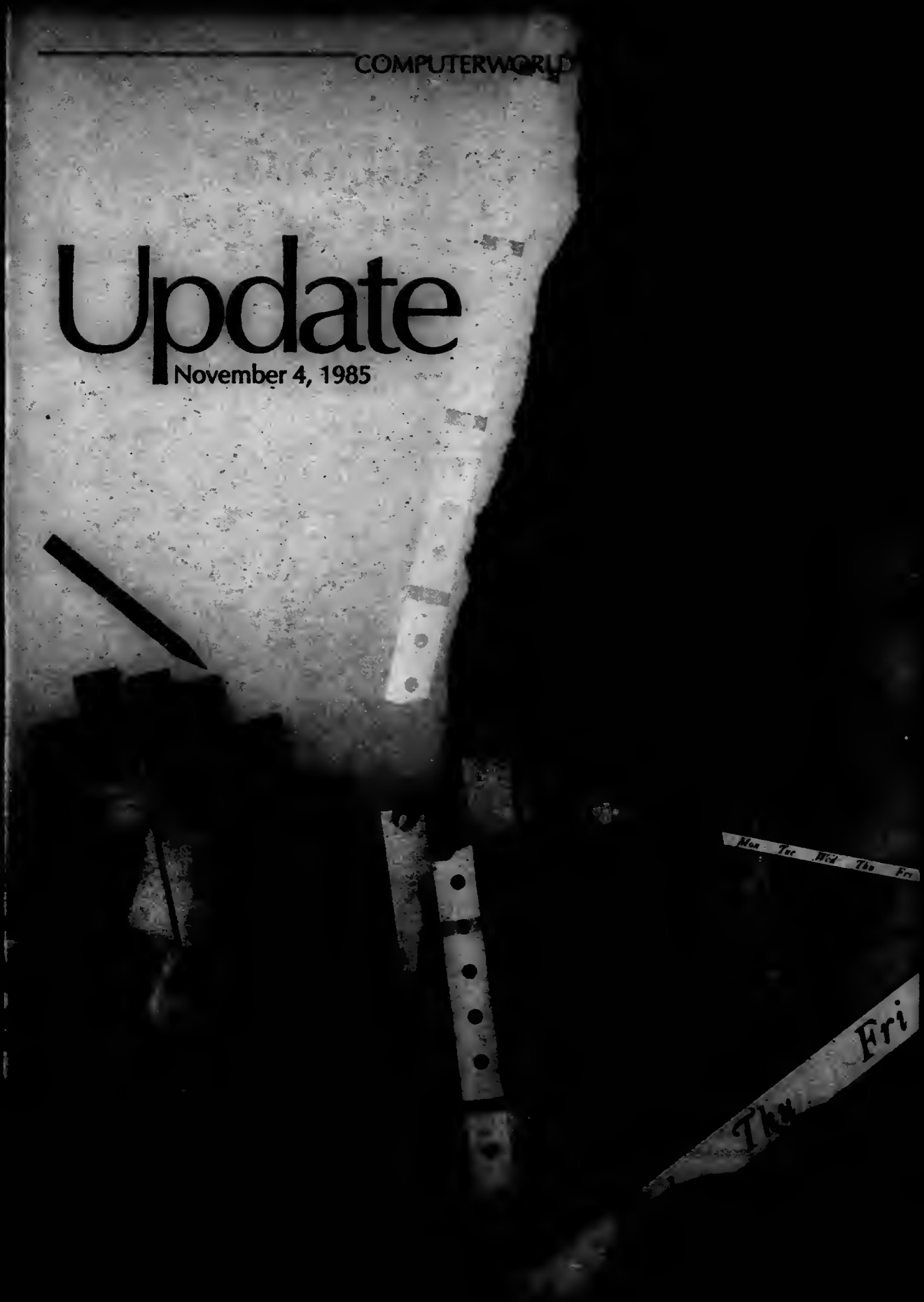
Update

November 4, 1985



Update

All stressed out and nowhere to go

By Glenn Rifkin
Update Editor

Before companies can be expected to take action to relieve the strain, they must acknowledge the problem exists in the first place. DP/MIS managers face the dual task of working through the problems of high turnover, low productivity and unhappy workers while convincing management that the problem is real and will likely get worse before it gets better.

As head of data processing for a Boulder, Colo., construction firm, Marie Christine Suarez found herself in an increasingly stressful environment. Management wanted better bottom-line results from the data center but was unwilling to invest in even the most rudimentary productivity aids for Suarez and her staff.

"Management clearly didn't appreciate what I did," Suarez recalls. "They didn't really understand the technology and DP requirements. They'd listen to my complaints just to make me happy, but there were no great changes. The bottom line to them was just to make money, and with that attitude, we were not able to keep up with the state of the art in technology."

Feeling trapped in a no-win situation, Suarez recently left the company and became an independent programmer/consultant. Though she continues to encounter stress in her new assignments — such as time constraints for programming assignments — Suarez manages that stress by taking control of her work life. "When I'm coding for a long time and feel that I'm reaching the burnout level, I just walk away from it for a while," she explains. "I'll sleep late or find something else to work on. Just being out of the work environment makes a big difference."

At the Bank of Virginia, Doug Hudgins, vice-president of systems and programming, believes his group experiences the stresses typical to other DP departments and then some. The No. 1 headache is matching user expectations to results. "The process of estimating how long a project will take is very difficult," Hudgins says. "Also, there is no real understanding outside DP of what we do, and as a result, there is not much appreciation of what we do."

As part of the banking industry, Hudgins faces even greater pressure because deregulation in the past few years has changed the business dramatically. "It's a whole new ball of wax," he says. "Banking used to be federally regulated, but now it is market driven, and new products are being developed all the time. DP has to react quickly to each new twist and turn. If the bank across the street comes up with a new product, you have to have a similar product and fast."

Craig Brod, an Oakland, Calif.-based psychotherapist and author of *Technostress: The Human Cost of the Computer Revolution* (Addison-Wesley Publishing Co., 1984) believes that the roles of MIS/DP professionals are changing drastically within the industry and that the cost of that change is increased stress on the job. According to Brod, his interest in this phenomenon was piqued when, during a therapy session, a senior systems analyst suffering marital problems due to work-related stress pointed to his wife and said, "She makes a lousy peripheral."

Stress in DP/MIS is a given. Whether one believes, as DP managers tend to, that their profession is far more stressful than others is relatively unimportant. Of growing concern to both those in the profession and those who consult to it is what is causing the great stress and pressure within the data center, and how can it be controlled or alleviated.

As information systems become more and more integral to the functioning of major corporations, top management is forced to take a look at this troubling outgrowth of the computer age. Before companies can be expected to take action to relieve the strain, they must acknowledge the problem exists in the first place. DP/MIS managers face the dual task of working through the problems of high turnover, low productivity and unhappy workers while convincing management that the problem is real and will likely get worse before it gets better.

This *Computerworld* Update examines the causes and effects of stress in DP/MIS and offers solutions from those in the field and consultants who specialize in stress management.

In addition, Update presents an exclusive *Computerworld* survey of

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COVER ILLUSTRATION BY KAREN WATSON

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Update

Stress in DP/MIS: a CW survey

By James Connolly

An endless stream of demanding memos, tight budgets, three-year application backlogs and employees and systems that seem to quit together — these are the causes of DP stress identified in a *Computerworld* mail survey distributed to 1,000 management-level readers.

The respondents leave no doubt: They say their jobs are twice as stressful as those of their counterparts in other departments. Surprisingly, while many managers may complain publicly about their users, only 18.6% of those surveyed cite satisfying users or lack of user understanding as their greatest challenge. The emphasis remains on management issues such as budgets, organization and employee relations.

Among the survey's other findings are the following:

- Heavy work loads, backlogs, unrealistic demands and inadequate staff are the key causes for stress.
- There is an underlying feeling that DP/MIS managers work longer hours for no extra pay.
- The greatest challenges in DP/MIS management are traditional corporate issues such as dealing with upper management, employee motivation and staffing.
- Drug and alcohol abuse are present, but in such unremarkable degrees that they have little effect on DP/MIS management.
- Marital stress and psychological problems are more prevalent than drug and alcohol abuse but still minimally affect the manager.
- Exercise and recreation are the most common releases for stress, but there are almost as many other methods for relaxation cited as there were respondents.

DP vs. others

In the section dealing with the DP/MIS manager's peers, the questionnaire asked respondents to rate the degree of stress involved with their jobs as opposed to comparable jobs in their company and with DP/MIS jobs in general.

Nearly 60% of the respondents feel their own jobs are either "extremely stressful" or "highly stressful." A rating of "extremely stressful" comes from 16.3% of the respondents and a "highly stressful" rating from 40.4%.

Whether DP/MIS managers, who balance the interests of so many corporate masters while staying on the leading edge of technology, endure more stress than other managers is a question that remains unanswered.

But the feelings are clear: DP managers believe they are under much more stress than their management counterparts, whether in accounting, personnel or production, and more stress than other DP/MIS workers.

Only two of 11 factors listed in the questionnaire are cited by half of the respondents as "contributing greatly" to DP/MIS management stress. Those are "heavy work load" and "dealing with unrealistic demands." Backlogs are cited as contributing at least somewhat in 75.4% of the responses, keeping up with technology in 68.5% and "number of staff members" in 67.3%.

Some of the factors cited as causes of DP stress are general management concerns, as the survey shows. More than 50% of the respondents say staff turnover and size of DP staff are problems of the same concern or of less concern to DP/MIS as they are to other departments. But that same area of the questionnaire brought into greater play problems such as keeping up with technology and backlogs.

Nearly half the DP/MIS managers asked to compare their work loads with those of other managers say that they work about the same number of hours. Almost half (49.7%) of the DP/MIS managers say they work 40-49 hours per week, with another 37.9% saying they work 50-59.

Salaries

One underlying current of dissatisfaction rises to the surface in the section of the questionnaire dealing with salary. More than a third of the respondents (34.5%) believe their salaries are lower than that of other managers. Another 43.1% of the DP/MIS managers say their salaries are about the same as those of other managers. The primary reasons cited for any negative differential are, "MIS is not considered an important job function/not profit making." Some of those who indicate that they are well paid cite their educational backgrounds, their skills and the fact that without DP/MIS, the company would grind to a halt.

In looking at the challenges involved in running a DP shop, survey respondents most often cite the problem of communicating with upper management or dealing with a lack of upper management support (29.3%). But the DP managers also show that they are being squeezed from above and below, with almost as many (29%) citing challenges such as motivating personnel, hiring and training.

In the more than 100 cases where the DP managers cite problems that hinder their operations — whether their own or staff problems — marital stress and divorce are mentioned more than half of the time, followed by psychological problems, alcohol abuse and drug abuse.

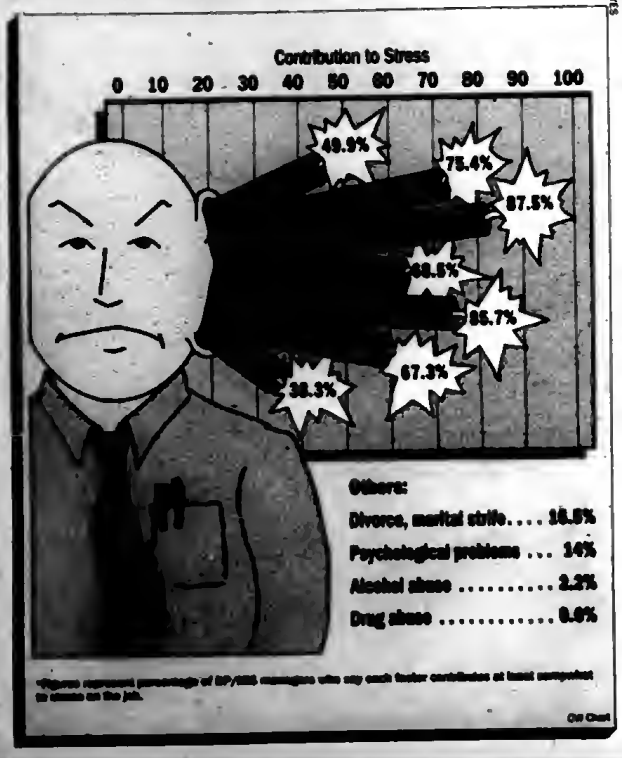
Where there is stress, the DP/MIS managers offer a wide variety of solutions to alleviate it. More than half say they exercise, participate in sports or other activities. Also commonly mentioned are "organizing work load" and "family/friends."

The respondents combat stress in various ways, such as reading, writing, travel, leaving work at the office, hobbies, religion and sleep. Some of the more noteworthy releases are "hack," "smoke a lot of cigarettes" and "yell." ■

Connolly is Senior Editor, Systems, for Computerworld.

BREAKDOWN OF DP/MIS MANAGERS' JOB STRESS RATINGS

FACTORS CONTRIBUTING TO STRESS IN THE DP/MIS MANAGER'S JOB*



MICHAEL J. MAYES

Profile of respondents

The "*Computerworld* DP Stress Survey" was conducted in September 1985. CW mailed questionnaires to a random sampling of 1,000 of its management-level readers and received 316 responses.

Of the respondents, 63.5% listed their titles as director, manager or supervisor of DP/MIS; 19% as systems manager or systems analyst; and 9.7% as director or manager of operations, planning or administrative services.

The managers had been with their firms for more than 10 years in 68.5% of the replies. ■

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Update

Continued from page 54
data processing professionals (see story page 56) focusing on stress and its causes.

The cause

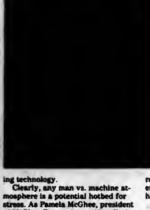
Longtime DP and MIS professionals tend to agree that occupational pressure historically has been high. And if it was bad in the past, it is now worse.

The reasons for increased stress in the computer-related professions are many. And for every general, industry-wide issue, there are likely to be as many specific, individual problems to match.

According to Michael Giannantonio, project manager in information systems for TRW, Inc. in Cleveland, the list of stress-causing problems is long and recognizable to virtually anyone in DP/MIS. Among the causes are the following:

- Tight deadlines.
- Trying to work within budget constraints.
- Finding and matching the right person to the right task.
- Sorting through company politics to find needed approvals and backing.
- Feeding the proper information to the right people.
- Knowing what the company's goals are and what the DP/MIS role should be in relation to those.
- Nonperformance of staff.
- Backlog.
- Unreasonable demands.
- Maintaining and upgrading the system.
- Keeping up with rapidly changing technology.

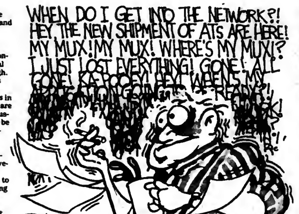
TOP 15 CONCERNS FOR DP/MIS PROFESSIONALS*



Clearly, any man vs. machine atmosphere is a potential hotbed for stress. As Pamela McGhee, president of McGhee Enterprises, a New York-based consulting firm, points out, DP is a constant, grueling test against the computer.

"Every project was due yesterday, and there is the endless struggle to get the system up, maintain it and handle activity on demand," McGhee says. "The atmosphere is often 'hurry up and wait.' Something is not important until it is hot, and then you have to go fast."

Ironically, though DP professionals believe they are in a high-stress environment, they seem to be unaware of the gravity of that stress. Gary Slaughter, a Tampa, Fla.-based consultant specializing in managing and motivating DP professionals, conducted a survey asking more than 1,000 DP workers to list the 15 most serious problems they contend with. Stress finished 13th (see chart this page).



Stress, however, can be an ambiguous term. Virtually every problem listed on Slaughter's survey results in stress of one sort or another. Rather than including stress as simply another problem, the survey may well have concluded that stress is the end product of all other issues on the list.

"I've found that DP pros bring on 95% of their own problems," Slaughter says. "DPers tend to characterize their environment as one of intense highs and extreme lows. They are eager to please, are high achievers and have big egos, and this causes problems in a lack of ability to control their own destinies. They overburden themselves and are unable to say 'No.' "

According to Brod, as MIS makes the transition from being an auxiliary-type function to an intrinsic part of the business, the pressure skyrockets. The days of the bearded, jean-clad techie manning an isolated service unit have changed. "I view this as a rise of a new 'cognitariat,' " Brod says. "People's brains, through information systems, are being tied directly to production, and that is an entirely new change for MIS. That has caused stress levels to climb."

Rapid changes are not easy for anyone to deal with, and DP is no exception. This new attitude of business toward information systems brings with it changes in how DP/MIS manages its function. "I'm observing that DP professionals are under greater pressure than ever in terms of bottom-line issues," says Madeline Weiss, a Washington, D.C.-based management consultant. "They are being asked to show how they are saving the company money, and this causes a lot of stress."

Adds John O'Connell, manager of the corporate data center at Montgomery Ward Co. in Chicago, "We have all the classic DP problems, and now there is much more emphasis to be productive and help make the company more competitive. That creates stress."

This need to be more competitive creates problems for DP people who are not generally considered interpersonally competitive, according to Harry Levinson, a clinical professor of psychiatry at Harvard Medical School in Cambridge, Mass., and president of Levinson Institute, a consulting firm in Belmont, Mass.

The use of computers has become more of a marketing than technical issue, Levinson asserts, and that shift has been difficult for people not used to an aggressive environment.

"The name of the game now is the bottom line," Levinson declares. "For DPers, there is a need to shift into a marketing orientation, and that means a great deal of stress. It lowers the self-image of people who always thought that their work should speak for itself."

Though CW survey results indicate otherwise, the spread of end-user computing is tagged by some as another leading cause of stress. According to Arthur W. Gutenberg, professor of management at the University of Southern California in Los Angeles, when central mainframes were the only source of computing in a business, DP held total control and "dictated everything." The proliferation of microcomputers "changed all the rules of the game."

Once they taste the fruits of computer power, users' appetites grow insatiable. Access to the mainframe data becomes a priority, and suddenly the controlled and secured data center begins to look more like a shopping center.

"Electronic data processing has to play an entirely new role," Gutenberg says. "And it is often not equipped to do that. The DP manager was given one set of rules when he was hired. In fact, he was hired for being good at [handling those rules]. But now he has to become a consultant. We're limited to the amount of change to which we can adapt, and when you are told that the rules are changing, it creates a lot of stress."

And if DP/MIS didn't have enough headaches handling the universal stress endemic to their new environments, it also must cope with the molehills and mountains specific to each company.

At Dataproducts Corp. in Woodland Hills, Calif., for example, Bill Strowbridge, vice-president of management information resources, was just finishing a complete redesign and reduction of his organization when business volume fell for the computer printer manufacturer. "We had to cut back drastically and got caught in a double dip," Strowbridge says. "It was very stressful for my people." Stress levels soared as employees felt themselves in a holding pattern and constantly feared layoff.

The stress was not confined to the staff either. Strowbridge himself felt the weight of the crisis more than anyone. "Layoffs are painful, and it really hurts to have to lay off people you brought in," he says.

The symptoms

Pressure on the computer worker can be enormous. When large companies computerize, slipups can be disastrous: the smallest error can disrupt a delivery schedule or misplace millions of dollars.

Jack is a senior programmer for a large bank. When a new system goes on-line, he spends his nights in a motel near the bank so that if problems develop, he is nearby to fix them. Every night for weeks afterwards, even when he sleeps undisturbed, he dreams that he's received the dreaded phone call — "It blew up!" — and must jump out of bed to get the system running again before the entire staff comes in to use it.

— Craig Brod
Technostress: The Human Cost of the Computer Revolution

Aside from an occasional sleepless night, some DP/MIS professionals, like workers in any field, respond favorably to certain levels of stress. Stress can be a motivation and challenge that helps alleviate boredom and complacency in a job. For the person with the innate personality and nature to handle it, pressure is welcome and often needed.

The line between positive and negative stress, however, is so fine that a person often crosses it unaware of the change. Soon enough, the signs manifest themselves. Research shows that too much stress can lead to physical problems in the form of high blood pressure, coronary artery disease, ulcers and other maladies.

Psychological problems, often more subtle, are an even more significant response to stress. According to Levinson, up to 80% of all the physical problems that a general practitioner sees are psychological in origin.

In her tenure in data processing, McGhee has seen such stress-related symptoms as hair-trigger tempers, decreased efficiency, job-hopping, burnout, increased absenteeism and a deterioration of personal relationships.

High rates of turnover are often attributed to the stress levels of DP although other factors have been noted as well, including high demand and low supply of talented personnel. Those who do leave a job because of stress are likely to move to

Continued on page 64

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COMPAQ

Update

Stress in the computer age: An interview with Harley Shaiken

Professor Harley Shaiken of MIT's Sloan School of Management specializes in the field of labor and automation. He is a widely recognized authority on the effects that computerization and automation have had in the workplace. His work focuses on the interaction between management and labor over the issue of automation in a variety of work environments.

Shaiken, who authored the recently published Work Transformed: Automation and Labor in the Computer Age *(Holt, Rinehart, Winston), spoke to* Computerworld *Update Editor Glenn Rifkin about the effects of stress on today's DP work force.*

How much a factor is stress among white-collar workers today?
Stress is becoming unusually important in the white-collar workplace. As a matter of fact, it is becoming the equivalent of what silicosis was to coal miners decades ago. It is becoming a characteristic disease of work in the computer age.

Is stress greater for the DP/MIS professional, or does each white-collar position have its own equal set of stresses?
It depends on the specifics of the workplace certainly. As an overall, generic view of the problem, those [people that hold] jobs that tend to be routine or that can be electronically monitored are often those that exhibit the greatest stress after computerization. Those people who get to exercise creativity and control over their workplace exhibit fewer symptoms of stress.

Have you seen examples in which creativity was part of the job but the person did not have enough control to exercise that creativity?
That is one of the central examples of where stress is generated. When you have a job that requires a certain level of creativity, but the structure of the job and the way technology is introduced makes it difficult to exercise control over that creativity, there is great stress.

Stress is really a function of increased control over people in the workplace. It is the flip side of reduced autonomy.

Is this aimed at a certain level of worker, the mid-level manager, the top manager?
Absolutely. At the very top, senior positions, either in design engineering, in data processing or in the office, often these senior positions are enhanced by computerization.

But for mid-level managers on down, there are new constraints imposed on how the job takes place. Because very often mid-level managers exercise a great deal of authority based on their access to information and on knowledge about what is taking place in the work environment. Many computerized systems seek to bypass that and give top managers access to that data. Under those circumstances, the middle managers may remain but with their authority greatly reduced. It's in those kinds of situations that we see stress.

What about the issue of data processing itself being so vital to the organization that the pressure on it to produce a bottom-line asset has increased more than ever?
Yes, I have seen that very often. In a sense it is paradoxical because it is a result of the success of data processing and computerization in terms of rationalizing other functions. That is, in earlier years data processing was so new that the focus was not on what was happening among DP people. The focus was on how effective their output was. Now that that output has been demonstrably effective in productivity terms, there is new attention focused on the DP process itself. That is the paradox.

When you have a job that requires a certain level of creativity, but . . . the way technology is introduced makes it difficult to exercise control over that creativity, there is great stress.

Did this catch DP people unprepared?
Yes, for many DP people it's a new experience. Many people have grown up in the industry with a certain feeling of autonomy and control over their work lives. And all of a sudden we see that being directly confronted by an emphasis on control over the entire operation, not by the individual involved but by constraints that are established to essentially have greater managerial control over the function.

What are your suggestions for ways that people should or could better handle these stressful changes?
It's a mistake to put the adjustment problem on the shoulders of the individual. The central questions that have to be asked are organizational ones. They are independent of the technology.

Those questions are, What is the role of the individual worker or manager going to be in how new systems are implemented and used? Does the human being have a central role in which the technology, in this case computerization, is a very effective tool to carry out certain functions, or is the computerization itself central?

Do you see corporations making any changes in the data processing area to deal with the issues of stress, or are they lagging behind in recognizing it as a major issue?
There is a distinct lag in recognizing it as a major issue. To the extent that it's thought about at all, it's after the fact. It is very seldom a consideration as to how a system is designed and implemented. It's not formally raised as a central concern at the beginning. At times if there is really a very serious problem, it may be addressed but often rather late and in a limited way.

I believe things are going to get worse, not better, if this is let simply to sort itself out because of what we talked about earlier.

If anything, we are going to see a much greater emphasis on productivity, increases on rationalization and on the use of computerization that results in elevated stress.

What will data processing professionals do in response? Will they unionize to fight back or is that too radical?
That is certainly one possibility, though there are few concrete signs of that happening today.

Many people in data processing are used to a certain level of independence and control over their working lives. To the extent that is increasingly infringed upon, collective action or unionization is certainly one scenario that could very well affect the industry.

What are others?
There could be a great deal of individual discontent that manifests itself in higher turnover and lower productivity. It could be a combination of the two. It could be unionization and individual resistence.

DP is already an area that is known for high turnover. This is not something new. The question is, is it high turnover because these people know they are valuable now and jump from one job to another or is it because stress plays such a factor?
They are not exclusive. Both could happen. Someone could feel that he is more valuable than the way he is being treated, and, in addition, there is a lot of stress on the job. So he leaves.

It's not that data processing people are unused to or adverse to stress as a function of creativity. That's not the issue here. It's stress as a function of control.

Should companies seek outside help or clean up their own houses?
Certainly a combination of both is appropriate. But a combination of both in some cases may not be enough.

It's easy to ignore the issue of stress in a very competitive and technologically very rapidly changing situation. All the pressures are to focus on other issues.

Increasingly, another issue is the bottom line. To the extent that companies often, by competitive necessity, focus only on the bottom line, stress may be discussed but not in a way that is particularly integral to the design and organization of work.

The real question becomes, "How do you include the feelings of the data processors themselves in this process of designing new systems?" To the extent that that is not done, we are going to face a lot of very bad situations.

Have you seen examples of bad situations already?
Yes, absolutely. As we see more erosion of the quality of life on the job for many people, we are going to see employees in data processing exploring alternatives.

There is nothing inherent about data processing that means that it will forever be nonunionized, for example. Data processors in Sweden and in other areas of the world are often in unions. We may see that as one of the changes that takes place in coming years. We may see other changes. It's hard to predict a scenario. ■

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Update

End-user demands add stress

By Donald L. Frantz
Special to CW

"It seems DP people spend their whole careers selling change, and yet they're the very ones who often oppose it from others." This remark was made by Herb Allard, director of the Data Services Division for the state of Wyoming. We were discussing the impact that the expansion of end-user computing was having on the DP profession. The ever-growing use of personal computers, minis, intelligent terminals and information centers has brought about a whole new aspect of computing both to our users and to the MIS organization.

While computer professionals have long been familiar with the high-stress aspects of their jobs — generated by changing technologies, expanding work loads and critical time schedules — a new element of change has been introduced. Directors and managers of information services are facing challenges to their professionalism, their methods, their work loads and their budgets. And these challenges carry with them a very real source of pressure and stress.

Users are saying that they can do for themselves what the information services group used to do, but faster, cheaper and in a more responsive manner. They throw down the gauntlet and dare the computer professional to accept the challenge.

The purpose of this article is not to address the merits of these challenges or what our responses should be to the technical issues. Instead I want to take a hard look at the stress being generated by these events and see if we can understand better what really is happening there. With a clearer understanding, we should be better able to consider solutions that will allow us to handle that stress more effectively for the benefit of the individual manager, the information services group and the end users.

Frantz is president of Management Consulting Services in Franktown, Colo. He has designed and presented a series of workshops on communication skills and human resource development in the computer field.

Fundamentally, the stress we see generated is the product of change. The change is directed now at the computer professional rather than at the end user. To handle this change we need to understand the change process and the various impacts we are likely to experience.

A simplified model of the change process suggests that we look at three major areas of impact: psychological, social and behavioral. These areas are all affected by the basic conflict between the organization's need to change to maintain economic vitality and our personal needs for maintaining a sense of security and preserving our self-esteem.

> *The confrontations we face with change and our associated stress are functions of our own individual attitudes.*

Noted management author Peter Drucker says, "Change is not only an intellectual process but a psychological one as well." Any change may alter the way in which we relate to and feel about what we are doing. The psychological impact of change focuses initially on our belief systems. Until now we have basically believed that we were fairly indispensable to our organization. Our technical skills and knowledge were unmatched. We alone were able to answer the technical questions and offer the solutions that the rest of the people in the organization so desperately needed (even if they did not recognize it).

But with the tremendous technical advances and the shift in general education to include computer literacy (starting in the first grade), we have suddenly found that our special expertise is not needed in the same way it was in the past. Our users have found user-friendly systems that allow them to find their own solutions to their problems, and they do not have to speak in hexadecimal to do it. And so we are faced with a very real threat to our self-image. The natural response is that of triggering our defense mechanisms. This automatically generates the stress of the "fight or flight" reaction.

This psychological defense reaction raises some very important questions that MIS management and the organization's top management need to resolve.

■ How is MIS supposed to sup-

Continued on page 68

Support reduces MIS strain

By Madeline Weiss
Special to CW

A survey I conducted among 241 management information systems managers revealed that work stress is widespread and detrimentally affects health and job satisfaction. Social support, whether from inside or outside the organization, is reducing symptoms of strain and improving job satisfaction among some MIS managers under stress. But that support is typically lower than that found among other groups of managers.

Stress is now known to be a major contributor to heart disease, gastrointestinal malfunctions, cancer, severe nervous conditions and neuroses. Job stress also has been linked to job dissatisfaction, job-related tension and anxiety and reduced productivity and effectiveness.

The managers in the survey represent a range of positions from vice-president or director to project manager. The mean age is 42.5 years, and 83% are male. The education level is high (56% have master's degrees and 7% doctorates). Both corporate and nonprofit organizations of varying sizes are represented.

> *The MIS environment is replete with situations that can cause stress.*

What are the symptoms?

Among the most prevalent symptoms of stress experienced by MIS managers are feeling restless and unable to concentrate; becoming less communicative and more irritable and excessively tired; feeling tense, uptight, fidgety; eating too much; misdirecting anger; and, surprisingly, experiencing increased interest in sex.

While the increased interest in sex may not cause much concern, the other reported strains do. Studies link job dissatisfaction with heart disease, chronic illness, disability and death.

Clearly, there is cause for concern for the health prognosis of MIS managers. From an organizational perspective, these symptoms surely must affect the job performance of managers.

Weiss is president of Weiss Associates, Inc., a consulting firm in Bethesda, Md., which specializes in management and organization development for MIS departments.

What causes job stress?

The MIS environment is replete with situations that can cause stress, such as work overload, role ambiguity, role conflict, responsibility for people, lack of participation in decision making, lack of feedback, keeping up with rapid technological change, being in an innovative role, career development and organizational structure and climate.

As a member of a service organization, the MIS manager must respond to frequently conflicting demands from other departments, many of which are seen as higher in the organizational hierarchy, even when the MIS function is headed by a top-level manager.

MIS managers complain of being excluded from high-level policy decision making, yet they must lead the efforts to create the changes decided upon in these policy making meetings. Users intent upon doing their own computing on the now ubiquitous microcomputer is viewed by many MIS managers as a further attempt to undermine what little power they have.

The role of social support

The finding that increased social support can alleviate the detrimental health consequences of these stresses is encouraging for many reasons. First, we may not be able to reduce directly many sources of stress because they result from the nature of the MIS manager's job — for instance, being in an innovative job and dealing with rapid technological changes. Also, some organizational norms cannot be changed easily.

Second, even if some of the sources of stress can be reduced, it may not be effective to do so. The MIS manager is an agent of change in an organization that exists in and responds to a complex and uncertain environment. The MIS manager can often bring about change more effectively in a more flexible and ambiguous role. So role conflict and ambiguity, which may be experienced as stressful, may help the MIS manager.

But social support can be increased without adversely affecting these other elements of the job. A difficulty in helping MIS manag-

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*Source: Newton-Evand Research Co. 1985 survey

Update

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another data center in a different company; they are unlikely to leave the profession, Weiss says. Often they find the same stressful environment in the new job.

In more extreme instances, drug abuse and alcoholism show up in the data center [CW, Oct. 7]. "It is extreme, but I see it a lot," Brod says. "People get into high-stress states, and they want to relax. They assume the only way to do that is to shut themselves off and drink alcohol or smoke dope — especially some of the younger members of the team. What they find out, though, is that alcohol is really a depressant, and there is no relaxation in the true sense from alcohol."

There are no indications that drug or alcohol abuse is more of a problem in DP/MIS than in other occupations. But experts believe that if the stressors remain untreated, problems will dramatically increase. According to Slaughter, many DP professionals work in a state of free-floating anxiety that causes frustration, paranoia and a fiesty, uncooperative attitude.

"If you take a look at the average DP executive, you'll see a male, age 45-48, with 10 years at the company and 20 years in DP. And he's burned-out," Slaughter says. "He feels that he is the most hated and estranged person in the company, being squeezed from all sides."

The solution

"Managers in general cannot avoid stress," says Larry M. Singer, a project leader at Ross Laboratories in Columbus, Ohio, and author of *The Data Processing Manager's Survival Manual* (John Wiley & Sons, Inc., 1982). "The job of managing DP projects and activities is almost guaranteed to provoke stress.

"What separates those who get heart attacks at 40 from the survivors is often their degree of realism. The heart attack or burnout victims try to ignore stress. They suffer from the sleepless nights but try to ignore the causes. Or they change jobs, but the stress follows them."

According to Singer, "the survivors" understand that stress is a natural part of DP management. They don't hide from it. They analyze the problem as they would attack any complex management situation. They ask themselves whether their stress typically comes from inside, is it related to specific projects, activities or people? Finally, is it controllable? If not, are they letting stress take over their management styles or even their home lives?

It is the rare and enlightened data center that holds regular workshops on stress for its employees.

"The survivors learn to manage stress rather than let stress manage them," Singer says.

"Managing stress" can be and often is an empty phrase. Before an organization can seek to manage this amorphous concept, it must recognize that stress exists and is a serious threat. That step alone may be the largest obstacle in modern business to treating stress.

Though many Fortune 500 companies offer workshops in stress management for employees through personnel departments, these one- or two-day seminars are often like putting Band-Aids on an open wound. "It can't be a one-shot deal," Weiss insists. "It takes constant reinforcement."

In addition, stress in DP/MIS often comes with unique characteristics that may not be handled by general workshops. It is the rare and enlightened data center that holds regular workshops on stress for its employees. More typical is the major airline, with 1,800 DP employees, that offers no special workshops or programs on stress for those workers. The DP personnel representative, when questioned, responded that she had not seen or heard of any particular problems with stress in the DP department.

DP executives who acknowledge that stress is an important issue conclude they must initiate programs to handle the problem themselves. Corporations struggling to find a competitive business edge are willing to commit resources to more hardware and software but often ignore the "peopleware."

Thus, DP/MIS managers, themselves under intense pressure, must shoulder the burden of stress among their employees. McGhee insists that poor management is the leading culprit in the spreading of stress. "Stress is not a top priority in DP," she says. "Many DP managers don't realize how much a factor it is.

"Better planning by management could help avoid the hot spots that cause so much trouble," McGhee continues. Certain "soft" spots are usually well known by those running the system, and the lack of contingency planning leads to more chaos when failure hits.

Management training

Poor management training for DP managers is also at fault, McGhee insists. Most DP managers are talented technical people who are promoted without the skills necessary to take on their new assignments. "A good project manager may not be a good people manager," she says. "Solid management training is needed." In fact, McGhee advocates bringing professional managers into the DP arena rather than simply promoting good technical people. The line people should be given a dual-career track in which they can maintain technical positions with promotions and pay increases without stepping into the managerial ring.

Even good managers, however, are not enough. Often stuck between a rock and a hard place, the DP manager needs better companywide support in handling the avalanche of requests that pour into the department. At Dataproducts, Strowbridge instituted an innovative method for easing the pressure on DP/MIS while getting better response and therefore happier users.

"Stress is created because the DPer either doesn't understand or cannot meet the requirements of the user," Strowbridge says. With a new structure of management, those problems are alleviated. At Dataproducts, each division set up its own information systems steering committee, made up of users, which reviews each request and then decides which request should be funded and when it is needed. The divisional steering committees must decide whether the request is contributing to the business goals of the company and what priority each one takes. Any request greater than $50,000 must go before a corporate steering committee.

"Now when you explain the approval process to someone whose project is not getting priority, it is no longer a DP decision but a management decision," Strowbridge says. "DP is simply responding to the needs of the business."

With the burden of being the heavy now lifted, DP becomes a service organization and part of the business rather than "judge and jury, which introduces conflict and stress," Strowbridge says. The new system deflects pressure from DP "and allows guys like me to have longer careers," he laughs.

Under this system, Strowbridge finds that his staff feels more confident about what its mandate is and how to perform. Its ability to meet deadlines rose dramatically. "We've developed a bunch of Green Berets," he claims.

For some, the preference is for more, rather than less, autonomy. Montgomery Ward's O'Connell believes that DP must control its destiny. "With that control, it is easier to respond to unreasonable demands," O'Connell says. "Otherwise you are just in react mode all the time. If the data center is under control, it limits stress."

At the Bank of New England, data services instituted an innovative career development program so that young programmers can get a taste of what they are getting into before making a long-term commitment.

"We send them to career assessment workshops, and they role-play the stressful situations they are likely to encounter in their jobs," explains Danielle Barr, vice-president of productivity services. "At that point, they can ask themselves if they want to deal with end users or just do technical consulting."

SIGNS OF STRESS*

STRESS SIGN CATEGORIES	RECOGNIZABLE SIGNS
Internal Body Processes	Breathing is often rapid. Body temperature drops while heart rate increases. Frequent feelings of nervousness or tiredness. Energy level is often visibly higher or lower than usual.
Muscle Tension	Tightening of the body's musculature. Signs of pain or irritation in the neck, jaw and lower back. General physical pains in the outer body regions. Headaches.
Emotional Reactions	Tone of voice reflects feelings of stress. Emotional reactions are expressed through facial expressions. Common emotions frequently associated with stress are fear, anger and sadness. Positive emotions, such as joy, may also indicate physiological stress.
Behavior Patterns	Changes in behavior patterns are indicators of stress (for example, changes in sleeping and eating patterns). Common behavior cues are rapid or unusually slow body movements. Nonverbal gestures of hands and face may also reveal stress.
Thought Patterns	Excessive thought to the point of distraction from the present. Circular thought patterns, especially blaming self or others for problems. Limited thought patterns, excluding everything in life but one problem or situation.

* This list of signs is meant to provide guidelines and should be considered in the context of the situation as well in light of other signs. No one sign is a good stress indicator.

Source: National Employee Services and Recreation Association

Others, such as Hudgins of the Bank of Virginia and TRW's Giannantonio, agree that prospective employees should be informed in the hiring process of what they are going to face. "We have an elaborate screening process for the people we hire, so they know what they are walking into," Giannantonio says. "We screen for people who can communicate and who can tolerate the stress."

In addition, TRW fosters a policy of open communication. "We sit down and talk to people right away if there's a problem," he says. "We get the issues on the table. The delegation here is good, and we give as much responsibility as possible. It's bad to have responsibility but no authority."

Communication between the data center and the rest of the company is also vital. O'Connell points out that his organization stepped up inter-organizational communication. "If everyone knows where the organization is going, it helps put things in perspective and dilutes the stress."

Hudgins has worked hard at establishing procedures to make DP deadlines more realistic. The toughest part is estimating time and cost of a project, so Hudgins has set up a process that works in stages. Early on, the projections are more vague and flexible and later get more detailed. Hudgins's veteran staff is used to the working environment and finds that this focused approach works well for them. "We don't have a lot of turnover or physical ailments," he says.

For DP/MIS pros whose organizations are less enlightened, there are practical methods for handling stress until better systems alleviate some of

Continued on page 68

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Update

Continued from page 64

the pressure. Levinson, in an article on stress in the workplace, writes, "One of the most immediately helpful ways of coping with stress is to get out from under it. . . . There are other temporary escape mechanisms like meditation, biofeedback and relaxation methods. They don't solve problems but, like aspirin, provide temporary relief. There is nothing wrong with temporary relief."

Weiss believes that DP/MIS executives are prone to Type A behavior (characteristic of aggressive, impatient, high-achiever-type people), and Type A managers will almost certainly cause stress among their staffs. Methods for modifying this behavior are available, Weiss explains, including workshops that offer better time-management techniques and such physical solutions as breathing exercises.

Exercise is also highly rated as a stress reliever according to experts. Suarez, for example, swims twice a week and goes hiking, camping and cross-country skiing regularly.

Professional help

As massive change hit DP/MIS in recent years, industrial psychologists, psychotherapists and counselors moved in to offer their services. Former DP professionals who took their experiences and turned them into full-time consulting practices have also begun to mine the untapped resources of DP.

Companies, usually through the urging of an enlightened or frustrated individual, are now bringing in outside consultants to help alleviate stress and other management/personnel problems in the data center. Though consultants feel that they are getting through more than in the past, they agree that a great deal is left to be done.

Brod has discovered that it is women more than men who are moved to action when it comes to people problems. "Women are much more sensitive to the fact that they are under stress," Brod says. "They are the people who usually raise their hands in groups. It's a male culture, and everything going on in that culture supports the traditional male posture, which is a lack of feelings and unwillingness to admit there's a problem."

According to Brod, it is more likely that he will treat a computer worker in his private practice rather than through the company, and it is inevitably the wife who pushes her husband to seek help.

Brod also dispels the long-held notion that DP/MIS types are loners who would rather avoid all this touchy-feely emotional exposure. As younger people from the social sciences or humanities discovered the attraction of MIS, the field has changed. "I don't buy the myth that the isolates go into MIS," Brod says.

Though one-on-one counseling is often the best remedy, most corporations go the route of professional workshops. Slaughter does extensive work with Fortune 500 companies and believes that "people problems are no easier to solve than technical problems."

Slaughter: 'DP pros bring on 95% of their own problems.'

In his workshops, Slaughter advises a sound, comprehensive program designed to tackle problems on a wide front. He seeks to uncover what is at the root of the problems: Are they individual or institutional barriers, and what are the obstacles standing in the way of the solution?

Slaughter offers a checklist of seven steps for handling the stressful changes that are occurring in DP/MIS.

- Recognition of the problem — gain an awareness that you are suffering.
- Forgiveness — learn to forgive yourself and go on.
- Provide choices for yourself.
- Inventory the cost of those choices — some might be so difficult to achieve that they are not worth it.
- Design and implement the process of change.
- Set up a feedback system to monitor your own progress as well as that of others.
- Establish support systems.

"I find that these ideas are often revelations to DPers who often would rather suffer than share their problems with others," Slaughter says.

Whether or not stress moves up on the DP/MIS manager's list of priorities is likely to be determined only by the negative effects it is having on productivity. If no one complains, the issues will remain buried beneath the backlog.

It seems more than likely that top management is not going to offer solutions. For every DP department asking for help, there are accounting groups, salesmen, manufacturers and office workers complaining about the same squeeze.

Is DP more stressful? "It is if we as senior managers allow it to be," Strowbridge says. "If we allow our relationships to our people to deteriorate, we have created our own stressful environment." ■

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End-user demands add stress

port expanded end-user computing?

- What will be the new scope of MIS responsibilities as end-user computing continues to grow?
- How are individuals in the MIS organization to respond to and work with end users who are independently growing with their own computing?
- How will end-user computing resources be coordinated with the entire organization's computing resources, and who will control those resources?

These questions must be answered if the psychological stress issues of a sense of security and self-esteem are to be alleviated.

These same questions also apply to the area of social impact. Social impacts are defined by those alterations that take place in the established relationships between the MIS organization and every other part of the organization as well as the shifts among relationships within the MIS organization itself. It is here that perhaps one of the largest (and for some the most difficult) attitude shifts is required.

In the past we have considered the MIS role as one of service to the organization. We sat on opposite sides of the table from our customers. Now we need to shift so that we are both on the same side of the table sharing both interests and responsibilities for meeting the overall organization's larger needs for change. While we still are a service organization, the needs are shifting in that they now include new and different kinds of services.

This calls for a great deal of flexibility on the part of MIS professionals. It is here that the third area of impact arises — behavioral changes. The actual physical shifts in the way in which we computer professionals do our job as a result of expanded end-user computing is where the stress of change is most acutely felt. Instead of initiating changes in the user's organization, we may now be called upon to advise, support and consult with them, and then leave them alone so that they can initiate their own changes. This calls for behavioral changes on our part and often generates stress.

What can MIS management do to address this problem? MIS management can most influence the manner in which the changes are implemented. The first step is objectively to seek answers to the questions listed above. This leads to establishing a framework of policy that the entire organization, MIS and users, can work within as teammates and not competitors.

The second step is to inform the MIS staff of the impacts of expanded end-user computing and overall direction for the MIS department. It is here that the issue of professional security and self-esteem must be addressed. The larger concept of an MIS-user partnership must be emphasized for the benefit of the organization as well as departments and individuals.

Third and finally, MIS management is encouraged to expand its knowledge and understanding of the change process. MIS management can then better recognize the stresses that will be taking place with this ever continuing change process and be prepared to work with individual staff members as necessary as well as the organization as a whole. ■

From page 62

Support reduces MIS strain

ers to enhance their social support and improve the quality of their interpersonal relations is that many hesitate to ask for support for fear their requests will be construed as a sign of personal weakness. This seems to be particularly true of new managers who think, "If I'm really a manager, I should be able to do it myself." In addition, the kinds of skills (empathy, consideration, sensitivity) involved in giving or receiving social support are often devalued as "soft" or "nonproductive" in most organizations.

Enhancing social support

Successful approaches for enhancing levels of social support should include strategies both to build social support into MIS organizations as well as to help individuals learn to be more supportive of each other.

One strategy for building social support into MIS organizations is to examine the power and reward structures of the organization to determine whether those structures encourage supportive behavior. If managers are evaluated and rewarded only for activity for which they are clearly personally responsible or if they are constantly placed in competition with their peers, they will have little motivation to provide support to peers. If they are evaluated and rewarded solely on the basis of the short-term productivity of their subordinates, they will have little motivation to support the long-term development of those subordinates.

Knowledge of the importance of social support and of the skills necessary to provide it should be part of the criteria for selecting and training MIS managers. This knowledge is especially necessary for first-line managers who often must deal directly with more subordinates than managers at other levels.

A further strategy is to embark upon a team development program whereby the MIS work team, including management teams, work together in goal setting and problem solving. In the process of dealing with work issues, they will enhance their working relationships and mutual support.

From an individual perspective, it appears that most MIS managers and professionals need some instruction or training to become more supportive. Workshops in which managers and professionals learn skills in giving support and increasing their interpersonal effectiveness can be very beneficial. Participants learn and practice skills such as empathetic listening, communicating effectively and becoming more sensitive to the needs of others.

The first step is increasing awareness of the importance of enhancing these skills. In one recent workshop, an MIS manager was horrified to see how menacing and unapproachable he appeared in a videotaped role play with another participant. His reaction motivated him to enhance his interpersonal skills.

For years we have known that encouraging supportive behavior and improving interpersonal relationships at work can improve both the morale and productivity of managers and professionals. We now have evidence that enhancing the quality of social support can reduce the detrimental effects of stress as well. ■

IN DEPTH

Boeing rolls out 'ultimate' network

By Terence Milholland
and George Roberts

Boeing's network standard takes GM's MAP one step further by linking MAP with IBM's SNA and Boeing's own TOP office protocol.

Boeing Network Architecture (BNA) is an overarching set of specifications for building compatible computing systems in a heterogeneous computing environment across organizational and geographic boundaries and encompassing the integration of data processing, office automation and factory automation.

This week, at the Autofact '85 exposition in Detroit, the Boeing Co. is showing off one of the results of BNA research — the Technical and Office Protocol (TOP). For the first time publicly, TOP products will be shown linked with products built to the Manufacturing Automation Protocol (MAP) standard backed by General Motors Corp. and others. At Autofact, computers designed for office DP will communicate with systems built by other vendors for factory automation. Part of the universal connectivity picture will fall into place.

Terence Milholland is manager of defense and space integration management at Boeing Computer Services Co., Bellevue, Wash. He managed the network applications support center, where he planned and implemented the BNA program across the Boeing companies.

George Roberts is general manager of the advanced technology applications division of Boeing Computer Services. He is also chairman of the Boeing Computer Services workplace automation council and the BNA council.

BNA takes into account strategic requirements, user needs and developments in evolving national and international standards as well as technology trends. As a result, users are able to achieve "real world" implementations, and they do so with a better understanding of how these current systems will fit the fully integrated architecture planned for tomorrow.

BNA originally was developed as a means to interconnect the Boeing multivendor-based data centers throughout the U.S. With the proliferation of micro- and minicomputer-based office systems and growth in networking technology, the architecture was expanded in 1982 to integrate office and DP systems through networks. The architecture was expanded again in 1984 to integrate manufacturing environments with DP and office systems.

Boeing Computer Services Co. provides information processing and communications services to operating companies in Boeing as well as to almost 1,500 commercial customers worldwide. Because of its diverse set of clients, Boeing Computer Services manages a large number and variety of computing systems and devices — more than $600 million worth, representing equipment from more than 100 different vendors.

Interconnect strategies

In order to contain the proliferation of incompatible computing systems and to manage future computing growth, Boeing established a corporate interconnect strategy in 1979. The interconnect strategy promotes development of networked computing systems that permit information access and sharing across strategic computer systems, regardless of application, terminal type or geographic location.

BNA implementation strategies are separated along management and technology lines. Boeing's basic management strategy has been to work with equipment manufacturers, directly and indirectly, to

achieve system compatibility. In 1981, the company was purchasing office automation products from 85 different vendors, far too many to achieve compatibility.

This number was cut to six: Digital Equipment Corp., Hewlett-Packard Co., IBM, Wang Laboratories, Inc., Xerox Corp. and AT&T Information Systems. Using executive management-level communication, Boeing asked these companies to help create a heterogeneous processing environment that could handle data exchange between dissimilar devices. This required the vendors to adopt common communications standards.

Not all of the companies immediately agreed, so Boeing temporarily stopped doing business with them. Today, vendors recognize their products must fit into Boeing's architecture. Manufacturers understand that large companies such as Boeing are no longer willing to accept standalone systems and solutions or products that are not strategic to the manufacturer's own long-term product line.

Other actions have been less direct. For instance, in 1982, Boeing joined with companies such as General Motors Corp., TRW, Inc. and Travelers Corp. to form the Network Users Association. The association's objective: to lobby both vendors and standards bodies for open architectures.

To prove that standards are workable, Boeing joined with GM and the National Bureau of Standards to cosponsor a multivendor demonstration of local-area networks implementing application-specific subsets of the Open Systems Interconnect (OSI) protocol. That initial exhibit took place at the 1984 National Computer Conference.

The problem

Just as city building codes provide standards for construction and service connections, developers of information processing and computing service environments need guidance and rules for planning, building and operating compatible information products and services.

Data, or information, is recognized as a resource that should be readily accessible and shared by all authorized users at Boeing. Networks are viewed as the pathway — not the bottleneck — to integration. To implement this vision, a companywide program was initiated to coordinate the planning and development of compatible computing systems over time. This program established an architecture base for systems builders: This architecture base is the BNA.

Boeing is a collection of autonomous companies, subsidiaries, divisions and subdivisions. Its engineering and manufacturing sites are geographically dispersed between Seattle; Wichita, Kan.; and Philadelphia. In addition, a subcontracting relationship exists between Boeing Commercial Airplane Co. in Seattle and other Boeing and non-Boeing organizations located around the world.

In 1978 and 1979, Boeing was in the midst of constructing two new commercial airplanes, the Boeing 757 and 767. To prevent the Seattle area from bearing the full brunt of an airline economic recession similar to the one that occurred between 1969 and 1970, Boeing management dispersed the manufacturing of the airplane components to company sites around the U.S. and to subcontractors in Italy and Japan.

> *Networks are viewed as the pathway — not the bottleneck — to integration.*

But the major airplane manufacturing support systems for the 757 and 767 were designed and developed in Seattle. These systems, such as on-line planning, wiring, computer-aided design and manufacturing, parts inventory and order location, constituted very large computer-based systems, developed along common lines and sharing common data base management systems. The investment of labor and computer equipment to build and sustain these systems could not be duplicated elsewhere in the company.

In addition, because of the sheer size of these support systems, the necessary computer processing environment was spread over multiple host mainframes. And because the manufacturing systems in the different factories were dependent on the Seattle computing systems for information, large volumes of data and transactions had to be transmitted between different hosts and different sites.

By 1979, Boeing Computer Services had installed a variety of hardware and software to support each Boeing organization's local requirements for data processing. Over 50 mainframes, almost 500 minicomputers and close to 25,000 terminals were available.

The number and variety of computing products and services were growing, but each site had an incompatible approach to networking, making remote access to the Seattle applications and data very difficult.

Boeing could provide business and scientific computer processing. But the user community wanted to be able to communicate with other mainframes and minicomputers in different data centers and have access to various special-purpose devices such as plotters and numerical control machines.

Most systems, particularly the software for networking and data-

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The time has come for straight talk about database management systems.

"The only reason to buy a database management system is to build better applications."

Throughout the history of the software industry, proponents of one database architecture after another have promoted their respective systems as the sole solution to a company's application backlog problem.

The early debate centered on hierarchical versus network architecture. Advocates of inverted file entered the argument in the 70's. And today, relational is the architecture of choice.

While this discussion about architecture is interesting, it's just not the issue.

Database management systems, beginning with the very first, were created to do one thing and one thing only—they were created to build better applications. *Building applications—efficient, online applications, faster, with fewer people—is the only real issue.*

Today corporations have a huge backlog to contend with. And the applications they need to develop have different characteristics. Some may be retrieval only. Some may be heavy on update. Some will run the company, and will require professional development. Some can be created by end users to satisfy their own needs.

It is extremely important to have a database management system that can handle all applications. *It is essential* that a database include tools rich and comprehensive enough to accommodate both the professional developer and the end user. It's the richness and power of these tools that's critical to the successful implementation of highly responsive fourth generation applications. What's demanded, in fact, is software that goes a *step beyond* today's conventional relational database systems.

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The only database management system worth buying is one that meets these six requirements.

Stated simply, IDMS/R is a step beyond today's conventional relational DBMS because it meets these key requirements for building successful applications.

1. MIS Application Development Facilities

The application development system required to build high performance production applications requires more than a fourth generation language. Cullinet's ADS/OnLine is a comprehensive application development environment for the MIS professional combining fourth generation language with a menu-driven modular development approach. Integrated with the data dictionary, this minimizes not just the programming but the entire design, development and documentation of an application. Furthermore, this approach produces a dramatic reduction in maintenance and support.

2. End-User Application Development Facilities

Because Cullinet recognizes the difference between production and end-user applications, as well as the need for both to share common data, we provide an easy to use end-user oriented development and inquiry system. The Automatic System Facility of IDMS/R is a non-procedural, menu-driven tool designed for end-users. Once data tables are defined, an application is automatically generated. The query facility of IDMS/R provides menu-driven query capability and full online help, so end-users can build working applications in minutes and get reports easily and efficiently.

3. Relational Architecture

IDMS/R allows for the definition of databases using the relational data model. Data tables and associated user views are easily defined online. Additionally, any number of key fields may be defined. IDMS/R also supports advanced relational features including referential integrity and domain definition. This architecture provides the capability to address all application requirements.

4. High Performance Database and Application Tuning Facilities

IDMS/R is a full multi-tasking, multi-threaded system providing for concurrent processing of on-line and batch, update and retrieval applications. Additionally, tuning facilities provide efficient indexing techniques, space management, page management, and buffer management. No conventional relational DBMS has these capabilities.

5. Dictionary Driven DBMS

Data integrity and data independence are essential in a DBMS environment. The dictionary actively controls the source and use of all data. Data definitions, data validation criteria, data formats and security are all defined within the dictionary and exist only once, eliminating redundancy and ensuring integrity. This information is then automatically used throughout the system. Examples of the functionality of this facility include never needing to define output formats for query; never needing to define field attributes for screens; never needing to code validation and editing criteria when using ADS/OnLine. Only IDMS/R provides this level of dictionary integration.

6. Open System Architecture

With the unique Open System Architecture of IDMS/R you can maximize your investment in existing software. IDMS/R accepts data from outside the database environment with direct access to VSAM files. In addition, applications written to access other databases like IMS, DL/1, TOTAL, or VSAM can directly access IDMS/R without modification. IDMS/R is designed to work in virtually all IBM mainframe operating systems and teleprocessing monitor environments.

IDMS/R: More than a relational DBMS

Cullinet

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management, were not compatible in the same vendor environment, let alone compatible between heterogeneous computer systems.

Further, most application systems had unique characteristics so that different applications required different terminals. Many engineers used multiple terminals to access different systems.

Most large companies shared Boeing's information processing requirements in 1979:

- The need to combine multiple hosts and data centers in a consolidated network.
- The ability for applications resident on one host to access data supported by other applications in other hosts.
- The need to provide common terminal access to different applications.
- The need for complete data integrity and the ability to interface old and new technologies.

Compounding this situation was a growth in the demand for computing services from users operating an expanding and varied base of terminal types. Because of this polyglot base, a single-vendor approach was not possible.

The solution

In response to its complex technology challenge, Boeing developed BNA. BNA is a master plan for electronically integrating geographically dispersed data centers, offices and factory DP systems into an information network while controlling the proliferation of incompatible information technology.

The architecture provides a framework by which Boeing can avoid duplication of effort, devise common solutions and protect against premature system obsolescence. The information network satisfies the communications requirements of each individual computing system while creating a corporation-wide set of consolidated systems crucial to the productivity of Boeing operations.

In effect, the BNA program allows Boeing to provide the control employee access to vast and growing information resources, regardless of location.

The vision

Boeing information systems have evolved in three major stages: stand-alone systems, stand-alone systems with automated assistance and integrated systems.

The stand-alone systems era, from 1960 to the mid-1970s, has one outstanding characteristic: labor intensiveness. Whether for office, factory or data center users, different application systems require tremendous amounts of manual processing; first, to find and extract pertinent data, often redundantly from the same sources; next, to convert data to a form for each computer system to process; and third, to pass on the results to other applications.

Data was not typically stored on-line for use by other applications and often required manual rekeying onto different computers or transportation by magnetic tape. Information took so long to produce that it was often approaching obsolescence by the time it reached the decision maker.

This situation began to change as Boeing recognized that networking was no longer the mere engineering of communications equipment for connectivity between terminal and computer. Rather, networking involves a coupling of host hardware and software with workstation hardware and software and, similarly, connection between distributed computers and central data center sites. Boeing called this new perspective "systems access."

With these new capabilities, Boeing passed into a second phase of data processing, in which some computing applications began to extract data from information retrieved from different computers. The retrieval process involved file transfers, transaction processing or a combination of both. On-line information systems proliferated and sharing of information grew, so the time necessary for data to reach decision makers shortened significantly.

But these systems remained basically independent, since expert analysts were still needed to know the location of each system's data, retrieve that data from other computers electronically and perform data reduction. While the information had greater currency, the problem of locating it remained. Most manufacturing data was available in

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electronic media — either on-line storage or tape — but could be stored anywhere in five major data centers. Worse, engineering data remained isolated within the engineering community, stored on paper or in dedicated, stand-alone computers.

The company realized that for its strategic systems to remain current, they must be interconnected electronically, not only to move data between systems but also to locate and manage it. The needed data might be resident on a large-scale storage device, on an engineer's personal computer floppy disk or in a manufacturing cell.

Boeing needed to create not only system access but also true data access — an environment where an information network for integrated systems determines where to find data, control access to it and move it in response to a user request.

This evolution in thinking spurred Boeing to establish protocols and specifications governing the implementation of applications delivery systems for interconnection, both in the data centers and in the office and the factory. This third phase in the integration of key information systems — systems that vary by operating company, function, processing environment and equipment type — is now ongoing and will continue into the 1990s.

When the process is complete, a Boeing user will be able to access information on a data base without knowing where that data base is physically located or the type of machine on which it resides. Boeing is moving toward complete device independence, allowing its users to concentrate on information, not access methods: Information flow times are being reduced and productivity increased.

This is a single-system vision, where information can be accessed or a work load distributed, regardless of geographic locations. The single-system image allows a user to employ one workstation and procedure to access required application processes and data on any general-purpose or dedicated host in the Boeing system of interconnected computers.

Baselines

Technologically, Boeing approaches the integration of vendor products through an intensive review and validation of individual architectures. The company wants its systems planners to be familiar with vendor architectures and to be able to map discrete products to them. Having this knowledge, the planners can then recommend products that are compatible with both a vendor architecture and Boeing's direction.

Boeing elected in 1979 to use IBM's Systems Network Architecture (SNA) as an intermediate baseline for integration and asked each of its major vendors to provide an SNA gateway. Boeing chose SNA because IBM is the company's largest single computer vendor. SNA is also the most completely documented, publicly available communications architecture.

However, protocols implementing the OSI model are Boeing's long-term baseline for communications integration. Basically, each vendor's architecture is used for networking that vendor's processors, and SNA or OSI gateways are used for access to other environments.

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> ***Boeing's long-term direction is toward an international standard for information interchange and content, such as the CCITT X.400 standard.***

Boeing chose IBM's Document Interchange and Document Content Architecture (DIA and DCA) specifications as the baseline for multivendor electronic messaging, using SNA and OSI as a foundation for communications. While SNA and OSI provide the ability to access systems, DIA and DCA provide the protocols and formats to control the exchange of information. Thus, vendors must also provide DIA and DCA gateways. Again, Boeing's long-term direction is toward an international standard for information interchange and content, such as the CCITT X.400 standard.

How will it all work? DEC machines, for instance, will be interconnected using Digital Networking Architecture and access to IBM environments using DEC's gateway products. Similarly, HP will be interconnected using Distributed Systems Networking (DSN) and access to IBM using its SNA gateway.

Between environments where SNA doesn't make sense, such as between HP and DEC processors, IEEE local-area network technologies will be used. Packet-network access, utilizing X.25, can also be supported, where appropriate.

While waiting for vendors to implement international standards or SNA gateways, Boeing developed interim gateways between strategic systems. For instance, at the data center level, Boeing developed software that links IBM, Control Data Corp. and Cray Research, Inc. processing environments for batch and interactive access. To capitalize on large investments in existing text processing systems, Boeing devised a text transform that passes files between IBM, Xerox and Wang units, delivering nearly 100% fidelity for revisable-form documents.

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These system interfaces are intended as interim answers. The company does not want to create and maintain a gateway for every vendor architecture. But where appropriate, these solutions are packaged and made available as part of Boeing's commercial product line.

Specifications such as SNA and OSI provide a transportation mechanism. Information must still be located, accessed and converted to the form desired. These capabilities, termed data access, control access to data bases, whether centralized or distributed across processing environments.

Companywide efforts were initiated in 1984 for this set of enabling technologies. Boeing selected IBM's IMS and SQL products as initial directions for data access and have begun to standardize its manufacturing and engineering data elements definition.

In the long term, Boeing's direction is toward a common data model supporting distributed query and update across dissimilar data bases.

Organizing for architecture

Planning an architecture and actually building one are two different things. Even defining the concept may prove difficult. Many systems planners and technologists think of "architecture" as the product line of a particular vendor. In this context, a network architecture is simply a mainframe and communications controller running vendor-specific software.

Boeing recognizes that these views might be construed as implementations of an architecture but do not actually constitute the architecture itself. Vendor products are the tools that provided architectural services but are not the actual architecture.

Boeing defines architecture as the deliverables of a definition process (Figure 1). In this model, the deliverables of the architecture research process are a set of strategic specifications in the form of time lines, statements of direction, implementation guidelines and standards.

Architectural management

Because of the decentralized structure of Boeing Computer Services, the company created a planning group called the Architecture Management Council, which is made up of representatives from every "line" division.

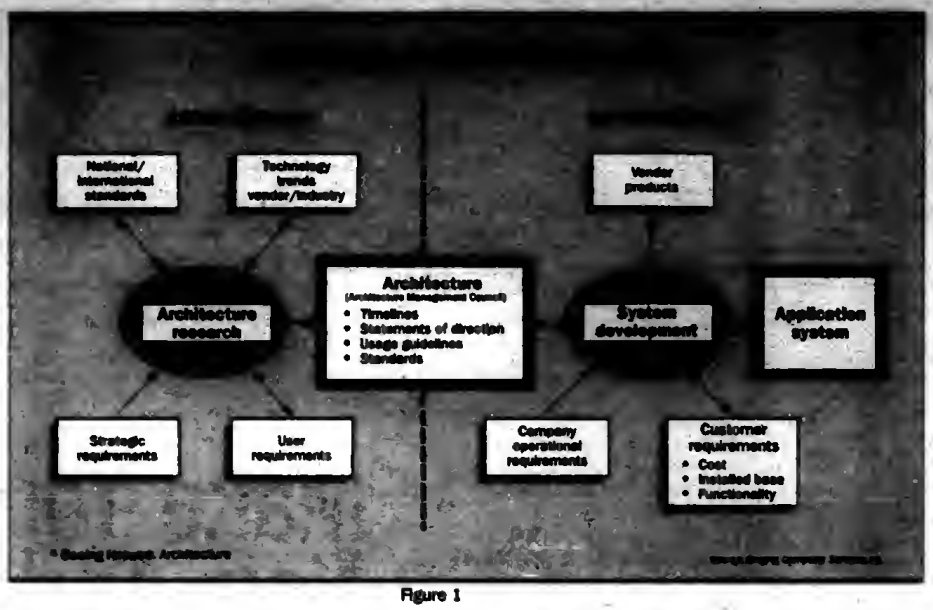

Figure 1

The council is composed of senior-level systems and technology managers who can and do make the final decisions about their information network development. This group approves BNA command media and assures its adoption throughout the various divisions.

The council charters research projects, reviews the results and agrees on the definition of the formal architecture specifications to be released in the company. In this manner, all organizations within Boeing Computer Services agree on the architecture, minimizing "not invented here" attitudes.

Initially, the group was led by an advanced technology organization, with Boeing holding no direct line of responsibility for the computing support. This organization initiated ideas, provided education on the technology, coordinated planning, documented the agreements, provided management visibility, got the right people involved and, in short, made things happen.

The Architecture Management Council defines what strategic capabilities are needed by the company over time. A subgroup of technology managers map computing technologies that will enable the different strategic capabilities. In an interactive planning process, a time line of strategic capabilities "pulling on" or being "pushed by" enabling technologies is developed.

The resulting architecture time line is a high-level master plan for systems integration. Thus, investment recommendations for research and development in those technologies and systems can be made in light of Boeing's long-term needs.

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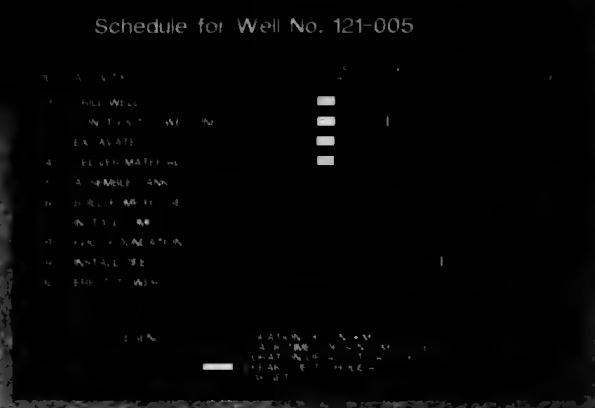

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gateways, network directories, graphics exchange, relational data base management, data dictionary and directory conventions and distributed data base.

Architecture establishment

The selection of enabling technology research and development projects is influenced by several factors, including specific user-functional requirements. The operating divisions provide input in the form of answers to questions such as: What problems should be researched? What are the information services desired? What are the priorities for the research efforts? When are results needed?

This is a two-way dialogue — the technology research groups provide guidance to the system builders as to what is happening in computing technology and when can they expect solutions to their technology problems.

The architecture definition process is also influenced by the direction of national and international standards. Because gradual conformance to standards is strategic, Boeing is vitally interested in their development and implementation in products. The company both monitors and participates in several standards bodies that are developing networking standards.

Technology trends, both as they affect industry and specific vendor products, are another major influence on Boeing's architecture research methodology. Boeing predicts its future products and capabilities through close liaison with its vendors.

In addition, Boeing leverages the vendor community to respond to its needs, particularly those for architecture network applications. Potential vendor technology time lines are mapped against BNA time lines. Boeing also may work with its vendors to develop products that accelerate the availability of networked applications.

Architecture research must incorporate a final set of criteria — the corporate strategic interests. These corporate considerations may be different from the user's functional requirements.

The result of this planning process is a set of applied research projects on various components of computing technology. These may take the form of advancing technology itself, exploring applications for the technology, a feasibility study, a field-oriented prototype or a full-scale engineering pilot.

These research projects occur throughout the technology and systems organizations in Boeing and are coordinated by the technology planning subgroup of the Architecture Management Council.

Architecture implementation

Architecture considerations must be balanced against other factors in designing actual applications. Systems managers choose a specification, akin to selecting the right tool from a tool kit, when building systems or products. Factors such as the installed base of equipment, cost and desired functions are balanced against available vendor products (not trends), architecture specifications and local operating requirements.

In Boeing, the interconnect strategy is considered important enough that to go outside the architecture, a system builder must receive a waiver from executive management and must demonstrate a plan to merge back into the architecture eventually.

As BNA is implemented and systems become electronically integrated, there is an increase in the software coupling between processing environments. This fact, not usually recognized when the industry discusses distributed processing and other resource-sharing technologies, complicates the management of the global network.

Times have changed, and the single-organization management approach is not necessarily applicable when sharing resources across multiple sites. Intelligence exists at all nodes of the network, and compatible functions may exist also, requiring more effective and efficient management of the environments.

In effect, operational management must be performed in a distributed systems management environment. This fact is incorporated in BNA through a standard operational methodology.

When Boeing began using its network architecture to link its data centers, it organized a task force of management and staff from operations across Boeing Computer Services — the people responsible for production delivery systems. These individuals were chartered to agree how to perform problem management, change management and configuration management in a network environment that crossed geographic as well as organizational boundaries.

The task force worked for six months to establish a common set of policies, procedures and standards to allow the implementation of the architecture. Basically, a set of BNA control centers, one per data center, was planned and implemented as the local focus for user problems and as the control center for change to the common network.

Command media

Earlier, BNA was compared to a set of building codes. Instead of building codes, Boeing uses the phrase "command media." Command media is a set of written technical specifications that have been validated through research and development work and can be implemented. Command media can be grouped in three categories:

■ A statement of direction analyses trends and implications pertaining to an architectural element and proposes a best-guess course of

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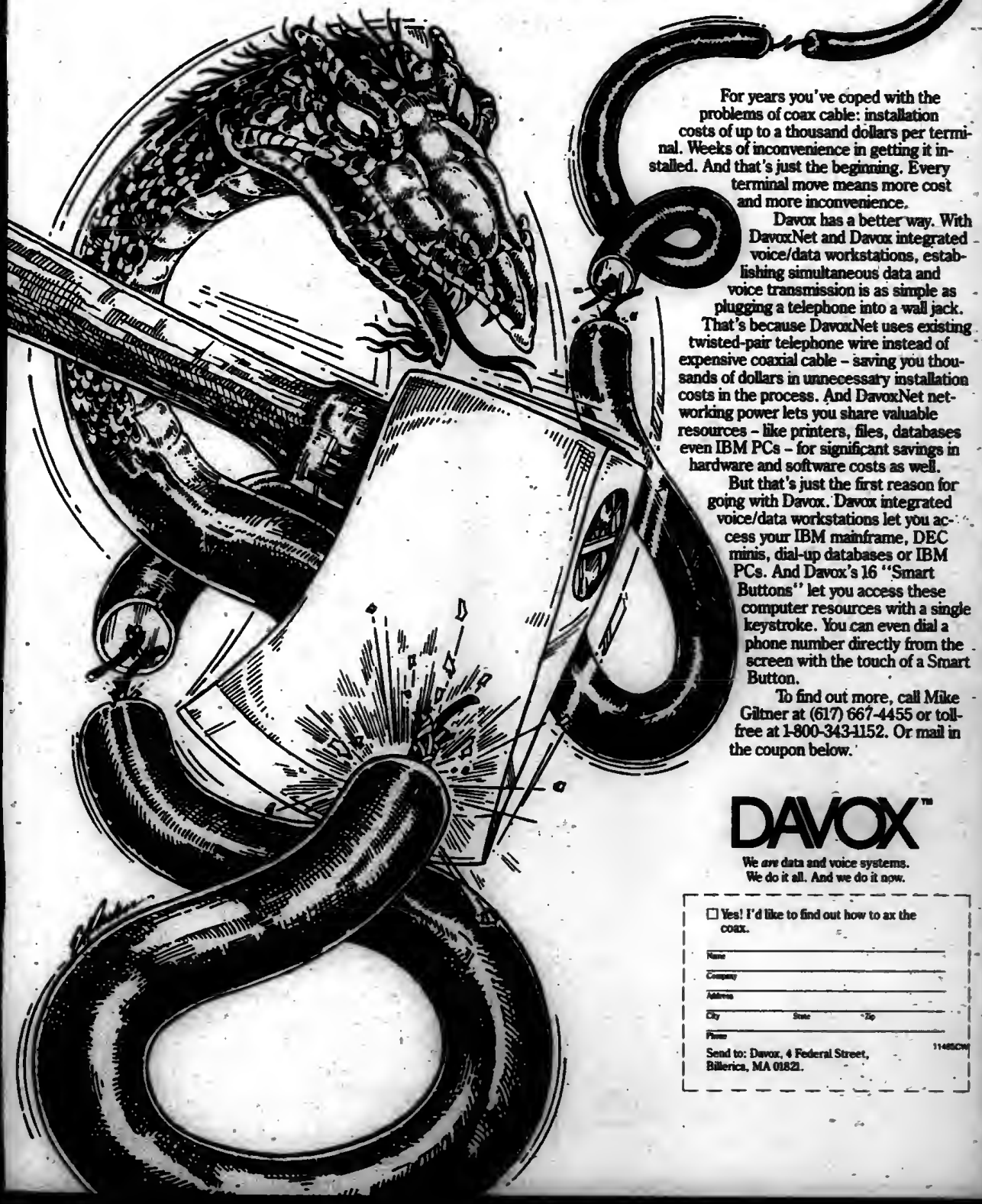

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action while additional research is performed.

■ A standard specifies quantitative and qualitative criteria for determining the acceptability of the product implementation of an architectural element.

■ An implementation guideline describes a method of performing a task to achieve an architectural objective and/or standard.

The body of command media is kept purposely small. Each is global or strategic in nature; for example, each applies across all organizations. This helps ensure that the architecture media is read, understood and used. The media needs not focus on one application but can combine specifications for compatible system and network architectures.

In effect, BNA command media is a set of rules for integration of all key Boeing computing environments and application systems, enabling the company to pool its critical information resources selectively.

Architecture models help provide clarity and s common basis of understanding. Various models have been developed over time and have proved very useful in indicating what computing direction is needed for what piece of the technology and the ramifications for management. The models serve as a common frame of reference for all aspects of the technology.

The basic BNA model has three information processing tiers: central, organizational and local. Information (text, data, graphics, image, voice) is shared between applications, both within and between levels.

At the local processing level, users perform such tasks as business forecasting, software engineering or text processing. Delivery systems at the local tier are workstations and local-area networks. Organization-level processing pertains to those non-application-specific functions required by multiple users; for example, intraorganization data dictionary, electronic mail and storage and retrieval services delivered through minicomputers. The central tier, or large-scale data center, addresses these same requirements on an interorganizational basis. The model allows Boeing managers to communicate the impact on services and products as technology changes occur.

There are many detailed versions of this model specific to the technologies of systems access and data access, but all are consistent in the use of the three tiers and in their nomenclature.

> ”
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> *Architecture models help provide clarity and a common understanding. . . . The models serve as a common frame of reference for all aspects of the technology.*

BNA provides the systems access and data access specifications for integrating these tiers across multiple vendors, both within and between tiers. For example, central servers are connected to organization and workstation devices via industry/vendor-standard wide-area networks. Organization and workstation servers are linked with IEEE local-area networks. The OSI protocols lie at the heart of this interconnection.

In the current implementation of BNA, batch and interactive access to information can be provided between a variety of application systems, including CAD/CAM, manufacturing support and inventory. The computing environments are connected utilizing many physical media, such as microwave, land lines and satellite, and IEEE networks are installed. Vendor architectures such as SNA, DEC's Decnet and DSN link each vendor's own systems together, while SNA gateways provide for intervendor access to information.

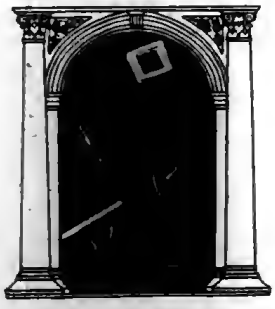
Intervendor electronic mail exchange of text, data and graphics is being planned and implemented. Until international standards for electronic messaging/mail are better established (for example, CCITT X.400), IBM's DIA/DCA-compatible products are being used. IMS provides a baseline standard for data base technology in IBM environments and will continue until the technology to link different vendors' data bases matures.

Network volumes have grown as users understand the new capability. Application designers are taking advantage of the resource sharing to use high-speed printers and graphics devices in other locations, and data bases are being accessed between locations. Major pieces of the information network for a single-system image are in place.

Over time, there have been significant advances in workstation technologies, such as processors, printers and software. Multiuser, multitasking desktop workstations are available with the capabilities of mainframes from a decade earlier. True distributed applications can now be constructed that take advantage of the capabilities provided by workstations and the enabling technologies of systems access and data access to find, control and move data across computing systems.

These distributed applications take the form of software tools that automate common tasks of data reduction from multiple sources. The tool kits that can be constructed include kits for software engineering, finance, industrial engineering, administration and mechanical engineering. The kits are integrated with each other and provide distribution of function across the three tiers.

Common utility software, designed for the requirements of information exchange, underlie these tools. Boeing is developing some of these distribtuted applications today, utilizing AT&T Unix as a common operating system to provide portability and multitasking across different hardware systems. ■



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IN DEPTH

Gateways grow up

By Grace Zimmerman

Gateways act as traffic cops on the data highways between local-area networks and host mainframes. If they do a good job, users don't know they are there.

PHOTO: STOCK BOSTON, CARY WOLINSKY

As sophisticated personal computer users demand more powerful application resources, communications tools become more of a necessity than a luxury. With the growing emphasis on "work group" business computing, users in many industries now regard communications networking as a vital means of boosting productivity by allowing the sharing of information as well as of expensive, high-performance peripherals.

Personal-computer user sophistication first drove the demand for microcomputer-to-mainframe links and then, more recently, the push for local-area networks that provide access to shared peripherals. Now, the emergence of another personal computer communications tool, the local-area network gateway, expands further the corporate repertoire of productivity-enhancing tools.

Modern portable local-area network gateways provide cost-effective network-to-mainframe connections, particularly when compared with more costly cluster controller alternatives. Better still, these gateways offer a growth path that can help remove the risks of choosing the wrong local-area network or media types. In short, they can help reduce the risk of local-area network obsolescence.

Gateway products differ widely in performance, configuration, cost and network compatibility. No single product is best for all applications. Therefore, local-area network users and DP managers should understand the new gateways and what features are available to make successful product choices for specific communications applications.

Traffic cops for data highways

Local-area network gateways act as traffic cops on the data highways between personal computer networks and host mainframes as well as between the local-area networks themselves.

Gateways' duties are simple. They effectively manage data traffic between the personal computer-based local-area networks and mainframes

Grace Zimmerman is director of marketing at Pathway Design, Inc., a Wellesley, Mass., vendor of gateway products for micro-mainframe networks.

> *Compatibility with IBM's Systems Network Architecture (SNA), an industry de facto communications standard, is desirable for all general-purpose network gateways. . . . A gateway should support multiple, concurrent SNA or bisynchronous sessions without visible performance degradation.*

so that the gateways' operations are transparent to users.

To do their job well, gateways should satisfy certain fundamental criteria. They should provide the throughput necessary to serve multiple users in a variety of application environments.

In addition, gateway designs should be flexible enough to ensure cost-effective upgrades to new local networks and accommodate increased user numbers without risking obsolescence.

Hardware vs. software

Gateway products differ according to all these criteria, but the most important initial difference is between hardware-based products and those that are software based, requiring minimal hardware.

Hardware-driven gateway designs typically operate as stand-alone network nodes that house multiple communications processing boards. They appear to host mainframes as 3274/3276 controllers and interact with networked personal computers via minimal personal computer-resident software.

Hardware designs can produce very high performance in throughput and device-support capacity, but users pay the penalty of high cost and low reconfiguration flexibility when product modifications or enhancements are required.

Software-driven gateways are becoming increasingly popular for business local-area network applications because of their lower cost per micro connection and greater flexibility and modular implementation.

Software gateways typically use a single communications adapter, a printed circuit board that resides in the "gateway server" personal computer. Although the gateway server manages interactions between the local-area-network and one or more host processors, it does not necessarily have to be dedicated to gateway applications.

SNA support

Compatibility with IBM's seven-layered Systems Network Architecture (SNA), an industry de facto communications standard that governs the interface between IBM data access methods and various peripherals, is desirable for all general-purpose network gateways. SNA's first two layers deal with the physical interface, while other layers oversee data organization and sequential processing for eventual translation and presentation by the seventh, or presentation, layer.

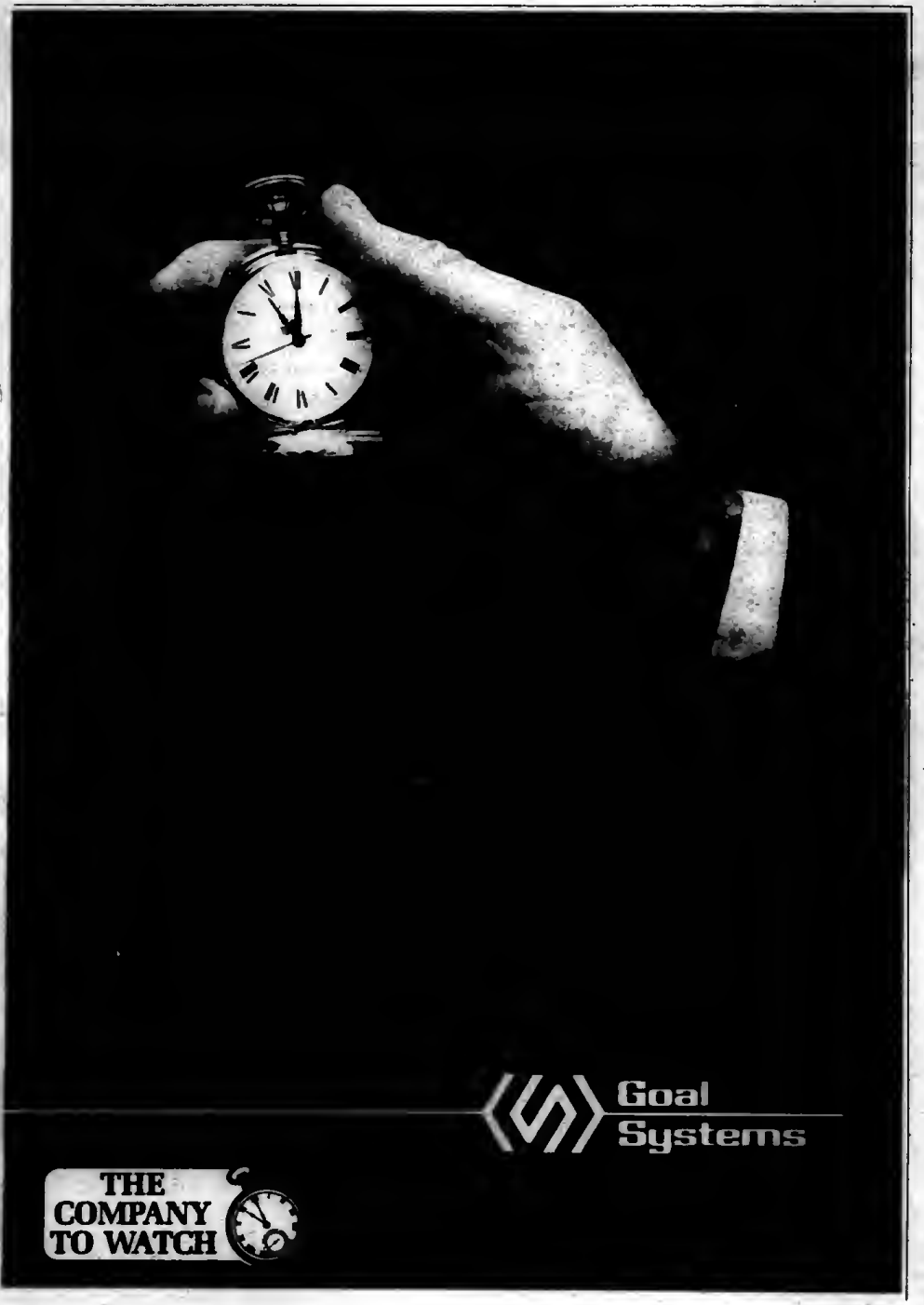
A gateway should support multiple, concurrent SNA or bisynchronous sessions without causing visible performance degradation. Most software-driven gateways permit as many as 32 concurrent sessions, whether allocated as one session for each of 32 different personal computers or as multiple sessions per personal computer with fewer operating personal computers.

Some networks will have more possible sessions than a gateway can support. Gateways differ in the way they handle this situation. Some, for example, support a fixed 32 sessions that must be manually reallocated when additional sessions want access to an IBM mainframe.

Other gateways have a "floating node" capability that automatically reallocates sessions on a first-come, first-served basis.

Design approach

The design approach for a software gateway is important because it determines overall network performance. For example, while



some local-area network gateway vendors place all seven SNA network layers in the gateway-server personal computer, other vendors distribute copies of the top layer, which determines application emulations, to each personal computer in the network.

This latter approach benefits performance by placing personal computer-specific SNA intelligence within each user personal computer. It also relieves the gateway-server personal computer from translation chores that are better carried out by the user personal computers.

Another feature to look for in SNA local-area network gateways is session hold capability, which allows users to exit communications emulation mode and run other DOS applications while maintaining the host connection.

> *Gateways must be designed to maintain compatibility with popular local-area network architectures and to support ease of future enhancements.*

Other options include emulation features such as user-definable keys and key sequences, nondisplayable and protected-fields security support and multiple concurrent printer support.

Design flexibility

Gateways must be designed to maintain compatibility with popular local-area network architectures and to support ease of future enhancements. Compatibility with popular IBM host computers, communications controllers, access methods and applications is critical, as is ease of porting to new local-area network architectures.

One networking operation system, the Novell, Inc. Netware product, is a current popular choice for a gateway system architecture because it supports a number of contemporary local-area networks. These include Novell's Netware/S, Proteon Associates, Inc.'s Pronet, Corvus Systems, Inc.'s Omninet, 3Com Corp.'s Etherlink, Orchid Technology, Inc.'s PCnet and others.

Crucial to the success of a gateway is an enhancement path from a single micro-to-mainframe solution to a local-area network gateway. This way, users can gain experience with simple personal computer-to-host communications, then add local-area network operations as applications needs proliferate or personal computer users are added.

A compatible enhancement path consists of similar commands for comparable user operations in both environments, such as file transfer and remote print support. This path will minimize the new-feature learning curve through consistent command techniques.

"User friendly" may be an overworked term, but the idea is no less critical in gateway communications than in other personal computer-

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> *Crucial to the success of a gateway is an enhancement path from a single micro-to-mainframe solution to a local-area network gateway. This way, users can gain experience with micro-to-host communications, then add network operations as applications needs grow or users are added.*

intensive applications. With gateways, user friendliness applies both to end users and programmers.

End users should be able to run host applications packages, download host files to individual personal computers or to the local-area network gateway server/file server for use by all connected personal computers, process data locally and then send updated files back to the host. Additionally, menu-based user tools should be available to expedite local-area network gateway installation, configuration and operation.

In the case of programmers, an interface command shell should be available to help them create end-user menus such as micro applications to the host emulation software and port the software to new networks or to specialized processors.

Cost comparisons

Gateways vary in cost from a few thousand dollars for software-driven versions to as much as $10,000 for high-performance hardware implementations.

Perhaps most crucial for business applications, software gateways are typically more cost-efficient than comparable cluster controller communications solutions currently marketed for micro-mainframe communications.

For example, a typical cluster controller configuration for 16 personal computers totals about $29,600, including $10,000 for the cluster control unit, $17,600 for 16 communications boards and $2,000 for a modem.

The same users could go with a software-driven gateway for $20,300. This would include the personal computer gateway processor at $3,000, a $2,000 modem, 16-station SNA gateway software for $2,300 and the local-area network itself for $13,000. Per-node cost for the cluster controller system is $1,850; for the gateway, $1,270.

The advantages of the local-area network gateway solution, as compared with the cluster controller alternative, are further accentuated when considering the cost saving associated with shared memory, printer and host access.

Shared resources like these make it possible to have the highest quality solution at reduced costs. These advantages are not possible with the cluster controller solution.

As cost-effective as they are today, gateways promise to pay even greater dividends in the future, as local-area networks and communicating personal computers grow in number.

Gateway intelligence will increase to take advantage of newer SNA features such as LU6.2 and Document Interchange Architecture/Document Content Architecture presentation services. Enhancements to computer horsepower will benefit gateway operations as well as newer generations of personal computers. ■

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FUSION.

NEW PRODUCTS

DEC unveils first in micro series

Digital Equipment Corp. of Maynard, Mass., has announced the first series in its Packaged Automation System family of Micro/PDP-11 computers for industrial I/O applications.

The first series is the IPQS packages that combine DEC's I/O subsystem with the Q-bus version of the Micro/PDP-11 computer running on the DEC Micro/RSX operating system.

The IPQS series has two models. Both models are said to come with 512K bytes of main memory, an RX50 400K-byte dual diskette and an RD52 31M-byte Winchester disk. The IPQS is packaged in a 60-in.-high cabinet that includes an I/O subsystem master chassis with I/O control, power supply and mounting space for 10 I/O modules.

Model IPQS1-AA/AD costs $22,100. It includes a Micro/PDP-11/23-Plus computer, the I/O subsystem, 512K bytes of memory, a 31M-byte Winchester disk, dual 400K-byte floppies, cabinet, Micro/RSX operating system license and advanced program kit license, according to the vendor.

Model IPQS2-AA/AD costs $23,000. It includes a Micro/PDP-11/73 computer, the I/O subsystem, 512K bytes of memory, 31M-byte Winchester disk, dual 400K-byte floppies, cabinet, Micro/RSX operating system license and advanced program kit license.

The IPQS series can be optionally expanded with up to two 10-slot expansion chassis, up to three 10-slot screw terminal mounting racks, up to 30 process I/O modules and up to 30 screw terminal strips. Add-on cabinets can accommodate a total of eight I/O chassis for up to 2,000 monitor and control points.

Software support is available under DEC's RSX operating systems, which are real-time, multitasking systems programmable in Macro-II, Fortran 4 and Fortran 77.

Tandy portable drive out

Battery-powered unit used for laptop machines

Tandy Corp. of Fort Worth, Texas, has introduced the battery-powered Tandy 200/Model 100 Portable Disk Drive for Tandy's Model 200 and Model 100 laptop computers.

The portable disk drive is said to provide 100K bytes of information storage on 3½-in. floppy diskettes. Operating from a menu, it reportedly lists the files on the floppy diskettes and offers functions such as format, save and load.

Tandy Corp. 200/Model 100 Portable Disk Drive

According to a spokesman, the data transfer rate is 19.2K bit/sec. Operation requires four AA batteries or an optional adapter.

If the portable disk drive senses low voltage during an operation, it will reportedly finish the job in progress, and, if the batteries are low, it will not initiate a new function.

A battery warning lamp on the front of the drive alerts the user to low batteries. There is also a disk access lamp that informs the user when the diskette is being accessed.

The portable disk drive is 2 in. by 4 5/16-in. by 6¼ in. and weighs only 1¾ lb. Operating software is included on the floppy diskette that comes with the disk drive. The drive is initiated by typing in a three-line Basic program.

The Tandy 200/Model 100 Portable Disk Drive will be available this month at Radio Shack Corp. computer centers and Radio Shack dealers. The drive is priced at $199.95.

Testing, debugging package debuts for IBM CPU software

Application Development Systems, Inc. of Minneapolis has enhanced Xpediter, its testing and debugging software package for IBM and compatible mainframes.

Xpediter was designed for use in Cobol and assembler environments under IBM's MVS, MVS/XA and VM/CMS operating systems. The package automates the testing and debugging phase of the program development and maintenance life cycle.

The version uses full screen technology to support the debugging process. A scrolling full screen display of the source code allows the user to watch the source code during execution, which helps to isolate the logical errors and the sources of abends.

Other features

Other features include display of variable values during execution and overtyping to change data values.

All features of the existing Xpediter package will be supported, including abend interception, optional batch mode operation and storing commands in procedure files for repetitive use or regression tests.

The product uses a symbolic data set that shields the source code from test activity, reduces maintenance and eliminates the need to compile-in/compile-out debugging statements.

Xpediter runs interactively with various operating environments including CMS, BTS and Roscoe and can also be used in batch mode.

The enhanced version of Xpediter is available through this year at current prices of approximately $30,000 to $50,000. Beginning in January, prices will range from $33,000 to $55,000.

INSIDE

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DEC enhances graphics interface

Digital Equipment Corp. has announced Version 2 of its MicroVMS Workstation software, the standard graphics interface for its Vaxstation I and II graphics workstation computer systems.

Version 2 of MicroVMS Workstation enables programmer developers to write applications programs in which users can create, manipulate and draw into windows displayed on the Vaxstation screen. Users will also have the ability to enlarge or reduce the windows.

Developers and end users will be able to emulate various terminals, including DEC's VT100 and Tektronix, Inc.'s 4014, in the different windows and to log on to each terminal. Users can reposition existing windows anywhere on the screen and can move windows to the top or bottom of the screen's stacking order.

Version 2 of the MicroVMS Workstation software is licensed at $1,000 and will run on both Vaxstation I and Vaxstation II, including the AI Vaxstation.

Motorola systems

Motorola/Four-Phase Systems, Inc., a subsidiary of Motorola, Inc. of Cupertino, Calif., has added two configurations to its line of AT&T Unix-based supermicrocomputers.

The System 290/5 has been added to the Series 2000 family, and the System 6350 has been added to the Series 6000 family. According to a spokesman, the primary enhancement to both of these systems is a 60M-byte, ¼-in. streaming tape drive that provides a simple and convenient method of backing up the systems' internal hard disk.

Both supermicro systems are based on Motorola's 68010 32-bit processor, and both support the company's Business Assistant series of integrated software services.

The System 290/5 features a 52M-byte Winchester hard disk and 1M byte of error-correcting random-access memory (RAM). The system costs approximately $22,600.

The System 6350, priced at approximately $16,700, features a 655K-byte, half-height floppy disk drive, up to 2M bytes of RAM and a choice of either a 37M- or 70M-byte Winchester disk that is expandable to up to 140M bytes.

Net interface out for IBM MVS users

Westinghouse Electric Corp. of Pittsburgh has announced Network Control Interface (NCI) software providing a single common entry point to on-line IBM MVS applications.

NCI's single-point entry capability reportedly permits the end user to design an entry panel that acts as the central switching point for application logon. Application selection is determined by a user-defined program function key, and connection to the application is executed automatically by NCI.

NCI executes as an IBM ACF/VTAM program under MVS. The perpetual license price for the product is $8,500.

Information appearing in the New Products section has been provided by manufacturers and has not been independently validated by Computerworld.

NEW PRODUCTS

PRICE REDUCTIONS

General Computer Corp. has reduced the price of its **Hyperdrive and Hyperdrive 20 internal hard disks** for the Apple Computer, Inc. Macintosh personal computer.

The new price of Hyperdrive is $1,695. The new price of Hyperdrive 20 is $2,195.

General Computer, 215 First St., Cambridge, Mass. 02142.

■

Data Technology Corp.'s Teammate Division has reduced the prices on the **Model 1110, 1213, 1120, 1223, 1132, 1120AT, 1132AT, 1132AT/H, 1160AT, 1320/R10 and 1420/R10**, the company's IBM-compatible fixed Winchester subsystems and removable drives.

The new prices are as follows: Model 1110, $995; Model 1213, $2,095; Model 1120, $1,195; Model 1223, $2,295; Model 1132, $1,895; Model 1120AT, $895; Model 1132AT, $1,295; Model 1132AT/H, $1,395; Model 1160AT, $2,495; Model 1320/R10, $2,495; and Model 1420/R10, $2,795.

Data Technology, Teammate Division, 2525 Walsh Ave., Santa Clara, Calif. 95051.

■

Texas Instruments, Inc. has reduced its suggested list prices on the **Model 855, Model 865** and **Model 855/Automatic Sheet Feeder** of its letter-quality **Omni 800** micro printer line.

The new cost of friction Model 855 is $739, and the tractor version is $799. The Model 865 is now priced at $999. Fourth-quarter shipments of the Model 855/Automatic Sheet Feeder are priced at $999.

TI, H-814, P.O. Box 809063, Dallas, Texas 75380.

■

Lear Siegler, Inc. has reduced the prices of its **ADM 11, ADM 11Plus** and **ADM 12Plus** general-purpose VDTs.

The ADM 11 conversational-mode terminal is now priced at $549. The ADM 11Plus advanced conversational editing terminal is now priced at $569. The ADM 12Plus advanced editing, conversational/block mode terminal is now priced at $599.

Lear Siegler, 901 E. Ball Road, Anaheim, Calif. 92805.

■

NEC Home Electronics, Inc. has cut prices on the JC-1216 and JC-1460 monitors and the PC-PR103A, PC-PR105A and PC-8027A dot matrix printers.

The NEC JC-1216 and the JC-1460 monitors are now priced at $499. The PC-PR103A printer now costs $399, as do the IBM-compatible PC-PR105A and the transportable PC-8027A.

NEC Home Electronics, Suite 10, 700 Nicholas Blvd., Elk Grove Village, Ill. 60007.

■

Borland International has announced that it is adding **Reflex: The Analyst**, an analytical data base developed by Analytica Corp., to its site licensing program.

Until March 31, 1986, Reflex customers can purchase a master disk and make up to 2,000 copies for $29,500 or an unlimited number of copies for $60,000. After March 31, the price will be $42,000 and $85,000, respectively.

Primary software upgrades will be available for 30% of the site license fee, and secondary upgrades can be purchased for 10% of the license fee.

The price for single copies of Reflex has been reduced from $495 to $99.95 through March, when it will cost $149.95.

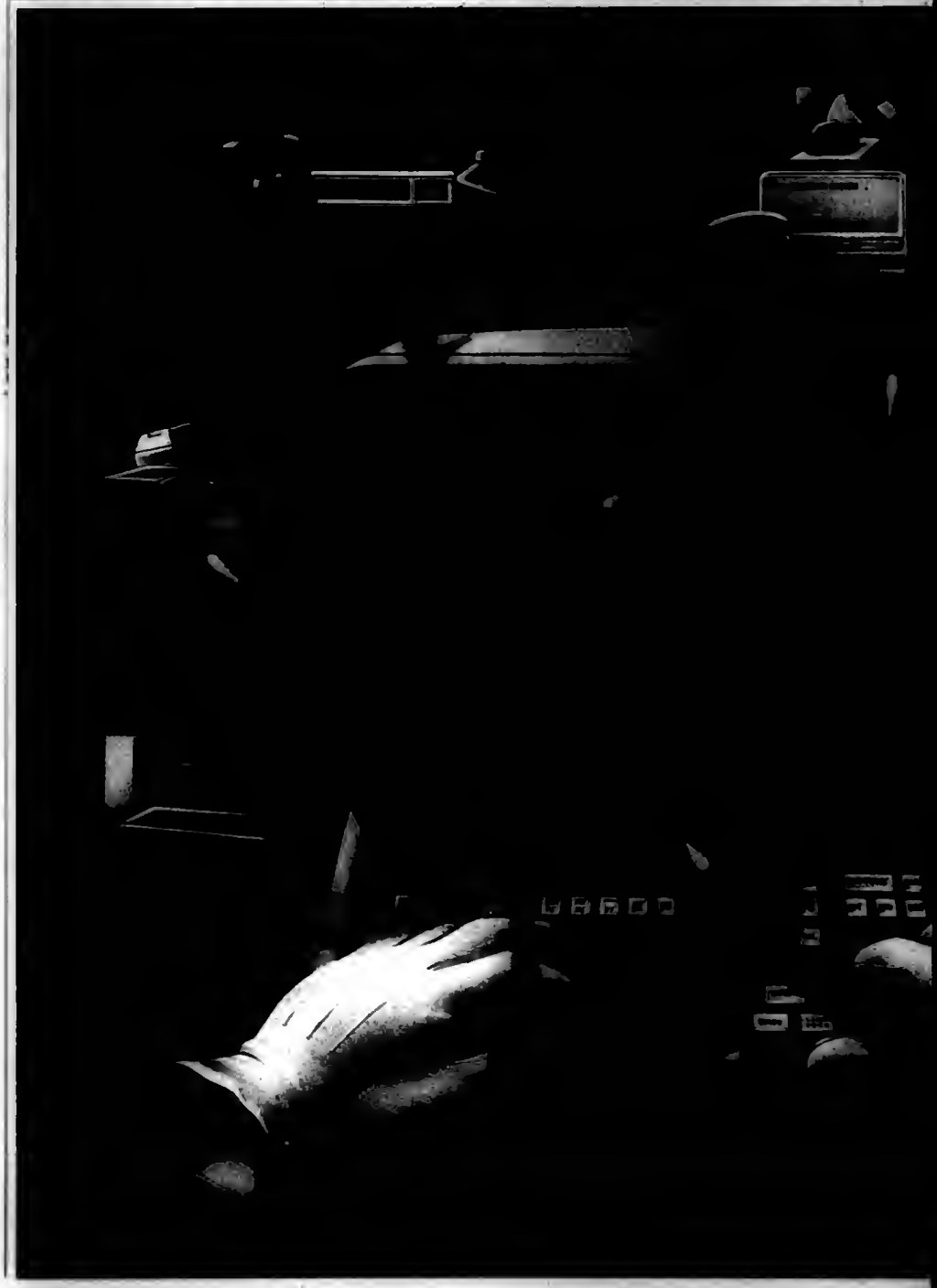
Reflex was designed for use with the IBM Personal Computer, Personal Computer XT, AT and compatibles running on IBM's PC-DOS or Microsoft Corp.'s MS-DOS Version 2 or later operating systems.

Borland International, 4585 Scotts Valley Drive, Scotts Valley, Calif. 95066.

SOFTWARE & SERVICES

Systems software

Peregrin Systems, Inc. has introduced **PNMS III**, a fourth-generation network management software system for the IBM 370, 3000 or 4300 systems using MVS/VTAM and for several mini



NEW PRODUCTS

and supermicro systems using AT&T Unix.

PNMS III lets users record, track and resolve problems that occur in a network. It includes a relational data base manager, a format manager and a report writer.

Users can access system data, create customized problem entry and analysis formats using data from many different files and generate user-defined reports.

PNMS is implemented with Peregrine Four, Peregrine's fourth-generation applications environment software.

Prices range from $5,000 to $35,000.

Peregrine Systems, Building C, 15530 Rockfield Blvd., Irvine, Calif. 92714.

Productivity aids

American Research Corp. has released a multiple file interface program, **Multifile**, designed for users of the SPSS, Inc. SPSS Information Analysis System on Tandem Computers, Inc. equipment.

Multifile functions as a link between up to 64 Tandem files. Users can create new data files by drawing on data selected from different files, facilitating data management and statistical analysis. Multifile can be used in interactive, real-time or batch environments.

The first-year Multifile license fee for Tandem SPSS sites is $4,500. For users who do not have Tandem SPSS, the fee is $7,500. Network and corporate licensing agreements are available.

American Research, Suite 20, 2885 E. Aurora Ave., Boulder, Colo. 80303.

■

Software World, Inc. has introduced **Dataprep**, a software utility for Digital Equipment Corp., Prime Computer, Inc. and IBM Personal Computer users that enables automatic data entry without programming.

Dataprep allows people without DP experience to design and install screen formats without programming, while DP professionals and other system integrators can create interactive systems for a variety of applications.

It has the functionality of a key-to-disk system, including browse and edit, keypunch verification, form mobility and multiple records per screen.

Dataprep is supported on DEC VAX, Microvax, PDP-11, -10, -20 machines and on Prime and IBM personal computers. It can be used on a variety of terminal types, including DEC's VT series. The software is written in Fortran.

Prices for Dataprep range from $2,800 to $4,000 on DEC VAX and Prime personal computers. The DEC PDP price is $2,300, and the IBM price is $795. Maintenance is 15% of the purchase price.

Software World, Suite 1905, 888 Seventh Ave., New York, N.Y. 10106.

Application packages

Goal Systems International, Inc. has announced **Release 2.1**, a new version of it performance monitor Explore/VM.

Release 2.1 provides enhancements to the product's real-time and batch reporting facilities. The enhancements to the real-time facility include complete extended color support, security for controlling the use of Explore/VM and additional report commands.

The batch reporting facility of Explore/VM now supports variable plotting with dynamic scaling and the ability to categorize users into performance groups, as well as to concatenate multiple history files for reporting. Six tabular reports have also been added.

The price for Explore/VM is $5,600 for a permanent license or $140 per month for a three-year renewable license.

Goal Systems International, 5455 N. High St., Columbus, Ohio 43212.

Data base management systems

Softlight Corp. has announced the menu-driven **Filing Systems Organizer** (FSO) for the IBM System/36.

FSO enables users without programming knowledge to establish and maintain computer-based indexes for their paperwork and files, client lists and program libraries.

The system features a free-form notes screen and a formatted information screen.

A data dictionary is supplied to link information stored to IBM's Query/36 and Displaywrite/36 so users can create custom reports and

Continued on page 90

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NEW PRODUCTS

Continued from page 89

mass mailings.

FSO runs on the System/36 under Release 3 or later of the System Support Program.

FSO is priced at $250.

Softlight, 303 S. Woodrow St., Clinton, S.C. 29325.

Training

Nastec Corp. has announced a video-based software engineering training curriculum, called **SETC**, designed for managers and practitioners of software development.

SETC contains 26 video modules covering aspects of software engineering from project planning to testing.

The videotapes are accompanied by six workbooks, a software engineering textbook, guidelines, checklists, exercises with answers and a detailed training guide.

An SETC 12-month site license is priced at $9,950 through this year. In 1986, a 12-month site license will be $13,900, and a 12-month renewal license will cost $5,900.

Nastec, 24681 Northwestern Highway, Southfield, Mich. 48075.

MICROCOMPUTERS

Software

Westinghouse Electric Corp. has announced **Scepter**, an on-line programming system that allows IBM DOS/VSE users to migrate to IBM's VSE SP2.1 enhancement of DOS.

Scepter provides users with simultaneous access to VSE and SP2.1 libraries, including a procedure library. To update a procedure, users copy it from the old library into a Scepter work file. Scepter changes the IBM JCL and catalogs the procedure directly into the SP2.1 procedure library.

Scepter costs $6,000.

Westinghouse Electric, Westinghouse Building, Gateway Center, Pittsburgh, Pa. 15222.

■

Intel Corp. has announced **Aedit-DOS**, an editor for creating and editing source and object code as well as text.

Aedit-DOS runs on computers using IBM's PC-DOS 3 as well as on Intel's Inteliec Series III and IV development systems and on Intel's Irmx operating system.

Aedit-DOS is menu driven. Also included is a macro library.

Aedit-DOS costs $350, the vendor said.

Intel, 5200 N.E. Elam Young Pkwy., Hillsboro, Ore. 97123.

■

Bradford Information Systems has announced that its **Interactive Distribution Planning System** (IDPS) software is now available for IBM Personal Computers and compatibles.

IDPS is an application package for vehicle routing, distribution planning and network optimization designed for companies that distribute products with their own truck fleet.

IDPS features various models, including vehicle routing, optimum location and optimum assignment of customers to distribution centers. It also has an order entry system.

IDPS interfaces with Lotus Development Corp.'s 1-2-3, Ashton Tate's Dbase III and Information Builders, Inc.'s PC/Focus for additional capabilities in reporting, data base analysis and graphics.

System requirements are an IBM Personal Computer XT with 512K bytes of memory and an Intel Corp. 8087 math coprocessor. IDPS also runs on Compaq Computer Corp.'s Compaq 286, Compaq Plus and Deskpro.

The price for the IDPS software is $10,000 for one copy, including upgrades to any future versions.

Bradford Information Systems, 5701 Nasco Drive, Austin, Texas 78756.

■

Writing Consultants, a division of Microlytics, Inc., has announced **Version 2.2** of its memory-resident electronic thesaurus software **Word Finder**.

Version 2.2 allows the user to select the nearest matching word when the exact word is not found, switch between 12 word processors, unload from random-access memory (RAM) and specify a DOS path.

Word Finder runs on the IBM Personal Computer, Personal Computer XT, AT and compatibles with DOS 2 or higher and 128K of RAM as well as on Digital Research, Inc. CP/M-based computers.

It costs at $79.95.

Writing Consultants, 300 Main St., East Rochester, N.Y. 14445.

■

Unilogic, Ltd. has enhanced its **Scribe Document Production** software to integrate automatically graphics images created on the Apple Computer, Inc. Macintosh personal computer with multiple-font text to produce typeset pages.

Scribe software allows users to produce documents of all types. The enhancement allows users to include a variety of merged graphics, such as bar charts, pie charts, flow diagrams, line drawings, curved shapes and halftones, in their documents.

Scribe runs on Digital Equipment Corp. Decsystem-10, Decsystem-20, VAX/VMS and VAX/Unix mainframes as well as mainframes from Prime Computer, Inc., Gould, Inc., Pyramid Technology Corp. and IBM and workstations from Apollo Computer, Inc. and Sun Microsystems, Inc. It supports Adobe Systems, Inc.'s

Continued on page 94

WHAT IF...

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Learn how you can attend the MAP training class and use MAP at your site free for sixty days. Call Bill Davis, Software Product Manager, at (408) 746-8861, to find out about this special offer.

MAP offers an easy-to-use, powerful, and economical way to answer your "What If...?" questions. What if your transaction rate doubles? Should you upgrade your CPU...or add more DASD? What if you're planning to install a new CPU? Will there be any surprises?

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For IMS systems, Amdahl's System Utilization Reporting Facility/IMS (**SURF/IMS**) lets you use prototyping to find out how changes in software affect your total system.

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*Developed for Amdahl by Qualitative System Performance (QSP) Inc., Seattle Washington

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SPECIAL REPORT

Protecting the Corporate Information Resource

Issue Date: November 25 • Advertising Close: November 8

As corporations continue to expand their computer systems and data bases, the need to secure corporate information is becoming increasingly important. *Computerworld's* November 25 Special Report on Protecting the Corporate Information Resource will address the many complexities surrounding the corporate security issue.

This Special Report will present a "nuts-and-bolts" perspective of securing the entire computer facility, including physical security (from mainframes to micros), data security, and disaster recovery. And its message will reach *Computerworld's* audience of 687,303 computer-involved professionals.

Our many features and tutorials will explore the importance of audit software, the differences between "hot" and "cold" sites, and methods for securing local area networks — plus creation of a disaster recovery plan and new technologies for determining user authentication. We'll also examine security legislation being studied in Washington and look at the vital roles played by the data processing manager and chief security officer.

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THE NEW VECTRA PERSONAL COMPUTER

FROM HEWLETT-PACKARD.

In today's fast-moving business environment, you need a personal computer that has the flexibility to fit perfectly with changing business needs and opportunities. The new Hewlett-Packard Vectra PC is just such a computer: flexible and versatile.

You get the *performance* you need, because you can select the power, speed and memory capabilities that suit you best; the *software* you need, because it's compatible with the IBM PC/AT; and the *hardware flexibility* you need, because it's designed to access a full range of accessories and peripherals.

The HP Vectra PC is a high performance computer. It's 30% faster than the IBM PC/AT. And with the addition of the optional co-processor, it can run even faster.

And since the Vectra PC is compatible with the IBM PC/AT, it runs PC-DOS 3.1 programs—without alteration. Like Lotus® 1-2-3,® MultiMate,™ and R:BASE™ 5000, plus HP's new AdvanceWrite word processing series, TextCharts presentation graphics, and more.

There are several internal and external memory storage

HP Vectra Specs

MEMORY
256K expandable to 3.64MB

MICROPROCESSOR
Intel 80286, runs at 8MHZ
Optional: Intel 80287; co-processor runs at 5.33 MHZ

OPERATING SYSTEM
MS-DOS 3.1 (compatible with PC-DOS 3.1)

DATA STORAGE
5¼" internal flexible discs (360K or 1.2MB capacity)
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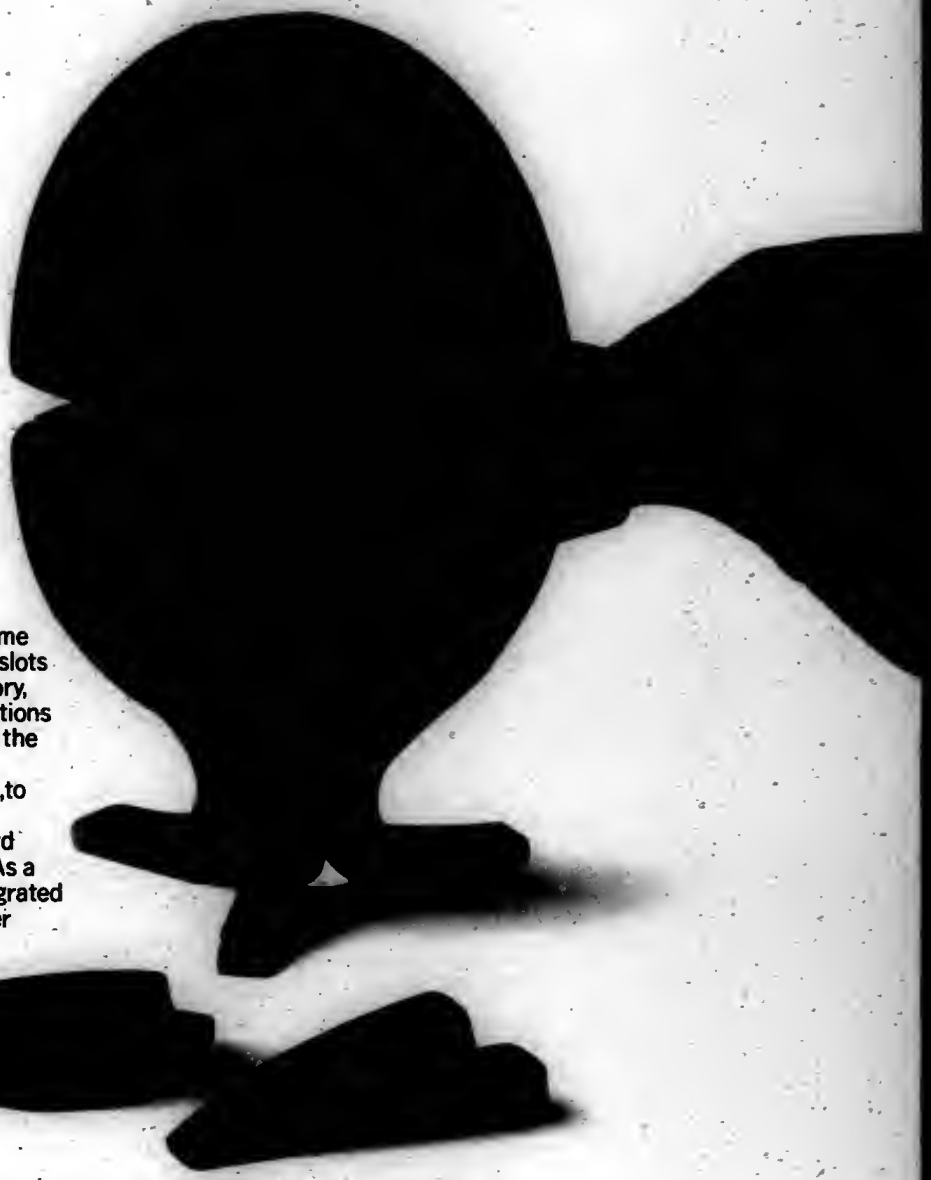

options, as well. So you can choose the storage you need now. Or expand as your needs change.

The Vectra PC has high resolution text and graphics capabilities. Color or monochrome displays. And seven expansion slots to add accessories, extra memory, data communications, video options plus a host of peripherals. Like the popular HP graphics plotters, ThinkJet and LaserJet printers, to name a few.

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Find out how the Vectra PC can fit your needs—whether technical, professional or secretarial. Call 1-800-FOR-HPPC, Dept. 282D, for the name of your local authorized Hewlett-Packard dealer, or Hewlett-Packard sales office. In Canada, call 1-800-387-3867. *Vectra*

HEWLETT PACKARD
Business Computing Systems

Lotus 1-2-3 business graphics shown. Lotus and 1-2-3 are registered trademarks of Lotus Development Corporation. MultiMate™ is a U.S. trademark of Multimate International. R:BASE™ is a U.S. trademark of Microrim, Inc.

PG02513

NEW PRODUCTS

Continued from page 90

Postscript, a page description language used with Apple's Laserwriter printer as well as other laser printers.

Scribe ranges in price from $4,000 to $25,000.

Unilogic, Suite 240, Commerce Court, Four Station Sq., Pittsburgh, Pa. 15219.

■

CPAids, Inc. has introduced **Time & Billing**, software designed for businesses that bill clients on a time-spent basis.

Time & Billing is a menu-driven program that can be used to calculate, print and process all billing; maintain staff files for up to 100 employees; print a list of billable hours and expenses on an invoice and maintain another list of actual hours and expenses incurred for in-house management use; and maintain an accounts receivable section.

Time & Billing is available on either 8-in. or 5¼-in. hard or floppy disks and runs on Digital Research, Inc. CP/M 80; IBM PC-DOS; and Microsoft Corp. MS-DOS. It costs $995.

CPAids, 1061 Fraternity Circle, Kent, Ohio 44240.

■

Ken Orr & Associates, Inc. has unveiled a version of its computer-aided software engineering tool, **Documentorr**, for the IBM Personal Computer XT, AT and compatibles.

Documentorr is designed to automate the production of project management and systems development documentation. It enables project managers to monitor progress, schedule resources and attain timely documentation.

Documentorr can be used in two modes. Development mode is for producing and maintaining documentation. Review mode is for reviewing and approving completed work. The software costs $6,900.

Ken Orr & Associates, 1725 Gage Blvd., Topeka, Kan. 66604.

■

Generic Software, Inc. has announced a computer-aided design and drafting package, **Generic CADD**, for IBM Personal Computers and compatibles.

Generic CADD is a two-dimensional design and drafting package featuring multiple layers, multiple line types, user-definable fonts and rubber banding line and windows.

Minimum system requirements are IBM PC-DOS or Microsoft Corp. MS-DOS 2 or higher, 256K bytes of memory, Intel Corp. 8087 numeric coprocessor, video graphics board, video monitor and two floppy disk drives. Generic Cadd costs $99.95.

Generic Software, No. 203, 6 Lake Bellevue, Bellevue, Wash. 98005.

■

Softstyle, Inc. has introduced its **Printworks for Lasers** software for the IBM Personal Computer, Personal Computer XT, AT and compatibles; the Hewlett-Packard Co. Laserjet and Laserjet Plus; and the Canon USA, Inc. LBP-8A1 and LBP-8A2 Laser Beam Printers.

Printworks for Lasers is an instant-access memory-resident program designed to make features of laser printers accessible through menus. Users can select type fonts, image size and other printer features. It allows users to merge files and images from different software programs, combining text from Micropro International Corp. Wordstar and graphics from Lotus Developent Corp.'s 1-2-3, and print them.

Printworks for Lasers requires Microsoft Corp. MS-DOS or IBM PC-DOS 2 or higher and a minimum of 60K bytes of memory although 256K bytes of memory are recommended. It costs $125.

Softstyle, 2080 S. Carboy Road, Mount Prospect, Ill. 60056.

■

Corona Data Systems, Inc. has released **Version 3** of its **LP-300 Laser Printer** software, featuring additional fonts and new commands.

There are now 38 fonts included with the LP-300. Features include automatic downloading of diskette-based fonts and more than 30 additional text, graphics and printer commands.

LP-300 runs on the Corona Personal Computer and other personal computers running under Microsoft Corp. MS-DOS or IBM PC-DOS. A 1.89M bit/sec. IBM-style personal computer controller board

NEW PRODUCTS

with a 64K-byte recirculation video buffer provides the hardware interface between the personal computer and the laser engine.

Existing users of LP-300 can upgrade to Version 3 for $65. The tool costs $3,395.

Corona Data Systems, 275 E. Hillcrest Drive, Thousand Oaks, Calif. 91360.

■

Contel Information Systems, Inc. has ported its **RTFile** interactive relational data base management system to microcomputers.

RTFile is now available for the Digital Equipment Corp. Professional 300 series running under DEC P/OS, DEC Rainbows running under Microsoft Corp. MS-DOS and IBM Personal Computers running under IBM PC-DOS. It has the identical functionality of the RTFile used with larger DEC computers.

RTFile's menu-driven functions include data base definition and display format generation.

Single-CPU, site and corporate RTFile licenses range from $500 to $20,000, depending upon the operating system.

Contel Information Systems, 4330 E. West Highway, Bethesda, Md. 20814.

■

Phoenix Computer Products Corp. has upgraded two of its software utilities, **Plink 86 Plus** and **Pfix 86 Plus**, and has included them in a package called **Pfantasy Pac 1**.

Pfix 86 Plus is a symbolic debugger that offers programmers in Microsoft Corp. MS-DOS environments configurable menus, configurable keys and trace-backs.

Plink 86 Plus is a linkage editor featuring overlay caching, object-file merging and overlay reloading upon function return.

Pfix 86 Plus and Plink 86 Plus are priced at $395.

Plink 86 Plus and Pfix 86 Plus are also part of a package of programming tools being offered by Phoenix. Pfantasy Pac 1 also includes Ptel, a file transfer tool; Pmate, a text editor; Pmaker, a version of AT&T Unix's Make utility; and Pfinish, a symbolic program/operating environment analyzer.

Until Dec. 31, Pfantasy Pac 1 costs $995. After that, it will cost $1,295.

Phoenix Computer Products, Suite 220, 1416 Providence Highway, Norwood, Mass. 02062.

■

Vaxon, Inc. has released **Concurplus**, a concurrent multitasking multiuser package.

Concurplus runs up to 10 application programs concurrently in the background; one keystroke brings programs to the foreground. The software allows connection to two serial RS-232 terminals for a three-station multiuser operation. The terminals may be plugged into personal computer communications ports or used with a modem hookup.

Designed for IBM Personal Computers, Personal Computer XTs, ATs and compatible microcomputers running IBM's PC-DOS, Concurplus requires at least 256K bytes of memory. It costs $395.

Vaxon, Suite 127, 6363 Wilshire Blvd., Los Angeles, Calif. 90048.

■

Concurrent Sciences has unwrapped a Microsoft Corp. MS-DOS version of its software debugger, **Soft-Scope**, and an in-circuit emulation package called **Hard-Scope**.

Soft-Scope supports the five MS-DOS languages offered by Intel Corp.: C, Pascal, Fortran, PLM and ASM.

Working with the Mice-II in-circuit emulator for Intel 8086 processors, Hard-Scope provides a symbolic interface for code generated by Intel high-level languages.

Both tools report breakpoints and stepping with the actual source line corresponding to the next line to be executed. Hard-Scope can display the 2,048-cycle trace buffer in terms of the user's source code, showing each source line passed through during real-time execution previous to a breakpoint.

Soft-Scope and Hard-Scope automatically display all variable types, including Pascal records, PLM and C structures, multidimensional arrays and real types. Users can qualify structure and array references to display the name and current contents of each field.

The products require an IBM Personal Computer, Personal Computer XT, AT or compatible processor; 256K

Continued on page 94.

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cations products
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3270 SNA GATEWAY.

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NEW PRODUCTS

Continued from page 95

bytes of random-access memory; and IBM PC-DOS 2 or higher.

Soft-Scope and Hard-Scope cost $500 each.

Concurrent Sciences, Box 9666, 106 E. Third St., Moscow, Idaho 83843.

■

Nothing-But-The-Facts, a demographic data base of 3,137 U.S. counties and 957 cities with populations exceeding 25,000, has debuted from **Melissa Data Co.**

Designed for IBM Personal Computers and compatible processors, the Nothing-But-The-Facts data base contains information on agriculture, crime, education, health, housing, labor force, income, population, poverty, vital statistics, trade and more.

Priced at $295, Nothing-But-The-Facts consists of 8.5M bytes of information on 32 diskettes.

Melissa Data, 12 Balboa Coves, Newport Beach, Calif. 92663.

■

Scenic Computer Systems Corp. has enhanced **Scenicwriter**, its text publishing system, to run on Microsoft Corp. MS-DOS computers.

Scenicwriter drives laser printers such as Hewlett-Packard Co.'s Laserjet and Laserjet Plus, and the Apple Computer, Inc. Laserwriter. Running on an IBM Personal Computer AT, the text publishing system can compose up to 180 camera-ready layouts per hour.

Scenicwriter costs $995.

Scenic Computer Systems, 14852 N.E. 31st Circle, Redmond, Wash. 98052.

■

Articulate Publications, Inc. has released **Adept**, a data base programmer tool kit for its Medical IS and Dental IS practice management software.

Adept contains 20 machine language and relocatable object functions that allow users to write programs to access the Medical IS and Dental IS data base.

Priced at $500, Adept is available for Digital Research, Inc. 8-bit CP/M and 16-bit CP/M, Microsoft Corp. MS-DOS and IBM PC-DOS computers.

Articulate Publications, 402 N. Larchmont Blvd., Los Angeles, Calif. 90004.

■

Interpath Corp. has unveiled **Assist**, interface software that simplifies commands in application software for the IBM Personal Computer, Personal Computer XT and compatible computers.

Assist is a menu-driven package that automatically generates program inputs and answers program requests, prompting the user for responses as necessary.

Toggled on and off with one keystroke, Assist interfaces with Lotus Development Corp.'s 1-2-3, Micropro International Corp.'s Wordstar and Microsoft Corp.'s Word software.

Assist functions include Load, Save, Create and Print, which require one keystroke to provide the same prompt sequences for each application program. It costs $69.95.

Interpath, Suite 253, 3333 Bowers Ave., Santa Clara, Calif. 95054.

Type-Set-It, a desktop typesetting system that uses font display on the IBM Personal Computer screen and produces near typeset quality on a dot matrix printer, has bowed from **Good Ideas.**

Type-Set-It generates 1,200 fonts, including italic, bold and condensed. All typefaces are available in 75 sizes from 5/64 in. to 1¼ in. in height.

Type-Set-It uses plain English, pop-up menus and no mnemonic coding. It requires an IBM Personal Computer with at least 256K bytes of memory, one disk, a Hercules Computer Technology Co. graphics card, monochrome monitor and Epson America, Inc. FX series or IBM Graphics dot matrix printers.

The package sells for $395. A $10 demonstration disk is also available.

Good Ideas, 175 Lowell St., Andover, Mass. 10810.

Wordtech Systems, Inc. is offering **DBChart**, a graphing utility for Ashton-Tate Dbase II and Dbase III users.

DBChart represents data in column, line, step, deviation, pie and doughnut charts that can be output to a printer, displayed on screen or used with peripherals.

Users can produce pictogrsph charts that use symbols to represent quantities. Basic symbols are supplied in an image library; custom symbols may be crested.

The program requires an IBM Personal Computer, Personal Computer XT or compatible processor with at least 128K bytes of random-access memory, a color graphics display unit and an Epson America, Inc. FX or IBM printer. DBChart lists for $99.

Wordtech Systems, P.O. Box 1747 Orinde, Calif. 94563.

Rio Grande Software, Inc. has announced **File & Report** data management programs that produce reports, lists and summaries for the Apple Computer, Inc. Macintosh, Apple IIc, Apple IIe and IBM Personal Computers and compatibles.

File & Report utilities include a record manager that offers options to add, change, find or view records, a report manager and a file manager, according to the vendor.

The program costs $89.95.

Rio Grande Software, P.O. Box 5906, 221 Nolana, McAllen, Texas 78504.

■

Management Graphics, Inc. is offering **Personal Business Slideware** (PBS) for designing business graphics for subsequent processing into

NEW PRODUCTS

slides, prints or overhead transparencies.

Users design slides on the personal computer and then transfer slide files via modem or courier either to a slide service center or in-house slide making system. The slide files are then processed into presentation-quality 35mm slides, 4-in. by 5-in. prints or 8-in. by 10-in. overhead transparencies.

PBS runs on the IBM Personal Computer, Personal Computer XT, AT, Compaq Computer Corp. Compaq Plus, Compaq and compatible systems.

It is compatible with the vendor's TTS/Plus and QM-1 Quickchart Concentrator computerized slide making systems.

PBS sells for $995.

Management Graphics, 1401 E. 79th St., Minneapolis, Minn. 55420.

International Expense Account Manager, a package that maintains business travel and entertainment records, has been announced by **Adaptive Software.**

The software converts foreign currency expenditures to U.S. dollars even if rates change within a given day or report. It reminds users of frequently overlooked expenses and calculates and categorizes common business trip expenditures.

Thirty-two travel expense items are supplied, along with prompts for information required by the Internal Revenue Service regarding business entertainment.

International Expense Account Manager for IBM Personal Computers and compatible processors costs $99. A version without foreign conversion, matrix format or graph options for the Apple Computer, Inc. Apple sells for $89.

Adaptive Software, 1868 Cavell Ave., Highland Park, Ill. 60035.

■

Gould's Basic Squeezer, a utility that compresses Basic programs to use less random-access memory, is available from **Waverly Systems, Inc.**

Gould's Basic Squeezer removes remark and comment lines from the source code. The compressed program is harder for end users to modify.

System requirements are an IBM Personal Computer, Personal Computer AT or compatible processor with 128K bytes of memory, DOS 2 or higher and graphics capability. The package will compress Basic programs written under current versions of IBM's PC-DOS.

Gould's Basic Squeezer costs $34.

Waverly Systems, 1003 Aline St., New Orleans, La. 70185.

■

Datalight has offered a compiler, called **Datalight C**, that implements the AT&T Unix System V C language for IBM and compatible personal computers running Microsoft Corp.'s MS-DOS.

A two-pass optimizing compiler, Datalight C provides Intel Corp. 8087 software floating support, a Make program, MS-DOS object file compatibility, type checking that flags mismatches and library/start-up source code.

Optimizations include common subexpression and dead code elimination, branch optimization, constant folding and strength reduction.

The library contains 125 Unix-compatible functions.

Datalight C produces DOS object files that can be used with the DOS linker, debugger and standard libraries and third-party libraries compatible with Lattice, Inc.'s Lattice-C.

The compiler costs $60.

Datalight, 11557 8th Ave. N.E., Seattle, Wash. 98125.

■

Virtu, software that lets multiple personal computers print files on a Wang Laboratories, Inc. VS printer, has debuted from **Math Strategies, Inc.**

The package converts personal computer print files into VS documents that can be output via the Wang VS with a laser or other word processing printer. Besides running on the Wang VS or personal computer, Virtu can work with the Wang Local Communications Option for the IBM Personal Computer, which includes Wang Word Processing with document filing.

Virtu uses a keyboard macro to drive document filing so no input is required from the user. The Virtu personal computer installation program requests user identification, password, VS document number and lines per page, which are stored as default values in a file for use at runtime.

Virtu licenses for $1,750 per VS CPU plus a $175 annual maintenance charge. There is no charge for personal computers attached to the licensed VS.

Math Strategies, Suite 306, Green Valley Building, 604 Green Valley Road, Greensboro, N.C. 27408.

■

True Basic, Inc. is offering **four libraries** for users of its **True Basic** language system for the IBM Personal Computer, giving programmers direct access to operating systems and communications ports plus the ability to develop data management software.

A forms management library, True Basic developer's tool kit, communications support library and Softcraft, Inc.'s Btrieve file management package comprise the set.

The forms management library creates a user interface by letting program developers define a screen's layout and I/O. True Basic developer's tool kit allows a programmer to work with the computer's operating

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NEW PRODUCTS

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system to manage logical bit operations and hardware registers.

The communications support library gives modem owners the ability to build communications applications. It supports two serial ports simultaneously running at speeds up to 19.2K bit/sec.

An interface to the Btrieve file management package enables programmers to develop data management programs.

Each library runs on IBM Personal Computers and compatible processors using IBM PC-DOS 2 or 3.

Prices are $40 for the developer's tool kit, $50 each for the communications support and forms management libraries and $65 for the Btrieve interface.

True Basic, 39 S. Main St., Hanover, N.H. 03755.

Samkhya Corp. has introduced **Sweep'r**, a disk cleaner that erases the contents of deleted files from floppy or hard disks for IBM Personal Computers and compatible Microsoft Corp. MS-DOS or IBM PC-DOS microcomputers.

Sweep'r was designed to allow users to avoid erasing an entire disk and prevent unauthorized users from recovering data.

Sweep'r can erase data with a particular pattern. The utility displays the cleaning as it occurs.

Requiring 64K bytes of random-access memory, Sweep'r can clean a 360K-byte floppy disk in 40 sec. and a 10M-byte hard disk in 30 sec./Mbyte.

Sweep'r costs $19.95.

Samkhya, Suite 3000, P.O. Box 142, 47 Sixth St., Petaluma, Calif. 94953.

Omtool Corp. is offering **MCBA Micro Level I** accounting, distribution and manufacturing packages for the AT&T 7300 personal computer.

The Micro Level I packages were developed for use with Softbol, Omtool's programming language that lets Dibol programs written for Digital Equipment Corp. computers run on most microcomputers without changing the applications.

Micro Level I packages run on Digital Research, Inc. CP/M 80 and CP/M 86; Microsoft Corp. MS-DOS and Xenix; IBM PC-DOS; and AT&T Unix and look-alike operating systems.

The tools cost $1,300 to $1,950.

Omtool, P.O. Box 477, Tewksbury, Mass. 01876.

■

Inner Loop Software, Inc. has unveiled **Boxes & Arrows**, a block-diagram editor for the IBM Personal Computer, Personal Computer XT, AT and compatible personal computers that run DOS Version 2 or higher.

Boxes & Arrows creates and maintains block diagrams plus associate spreadsheet-type calculations with diagram objects. It edits text, boxes, points and lines that comprise block diagrams and has the ability to automatically move lines connected to an object, as well as the object itself.

Diagrams can be up to 800 times larger than a screen, with large diagrams printed in strips according to the width of the printer paper.

It requires 384K bytes of memory, one double-sided diskette drive and a monochrome or graphics display.

The single-copy price is $395.

Inner Loop Software, 5456 McConnell Ave., Los Angeles, Calif. 90066.

■

PrintQ, a print spooling subsystem for IBM Personal Computers, Personal Computers XT, AT, PCjr and compatibles has been unveiled by **Software Directions, Inc.**

The program lets users execute application programs while printing. Once loaded with the program disk, PrintQ remains resident. It intercepts documents bound for the printer, spools them to disk and then prints them according to user commands.

Priced at $69, PrintQ requires IBM PC-DOS or Microsoft Corp. MS-DOS Version 2 or higher, one 360K-byte or 1.2M-byte diskette drive and 30K bytes of random-access memory.

Software Directions, 425 Rt. 10, Randolph, N.J. 07869.

■

Mortgagease, software that lets lenders analyze mortgage products and borrowers, has bowed from **General Electric Mortgage Insurance Co.**

Mortgagease, which runs on the IBM Personal Computer and compatibles, simulates a loan's performance in a range of economic scenarios and the effects of varying product features such as interest rate and payment caps.

The program provides debt-to-income and loan-to-value ratio analysis for a loan's term by projecting the growth of borrower income, nonhousing debt, taxes, insurance and fees and housing appreciation rates.

Users can run simulations with historical data, lender-supplied forecasts or worst-case information.

Mortgagease costs $2,195. A demonstration disk is available for $20.

General Electric Mortgage Insurance, 6601 Six Forks Road, Raleigh, N.C. 27609.

■

Cotton States Mutual Insurance Co. is marketing an insurance agency automation software package, called **Partners**, designed to benefit both the agent and the home office.

Partners is a menu-driven system used for generating applications, storing files on clients and word processing.

Partners runs on multiterminal supermicro computers under the AT&T Unix operating system.

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The IS-687 Printer is plug-in compatible and interchangeable with the IBM 3287 Printer, Models 2, 3, 4 and 5. It can be used with S/370, 43XX and 30XX Processors or compatible systems

The IS-687 connects directly via coaxial cable to the IBM 3274 (Local/Remote) and 3276 control units, to the 4300-series Processors and to the IS-674 Communication Controller.

The IS-687 is a low-noise, heavy duty matrix printer, in an attractive tabletop design. It operates at a speed of 200 cps in data processing mode, and provides an option for near-letter quality printing at 50 cps. It fully supports BSC and SDLC/SNA communication protocols. Advanced self-test and diagnostic procedures achieve high standards of reliability and sevicebility.

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NEW PRODUCTS

Systems

System Development Corp. has announced the **B26WST-Master**, the **B26WST-Stand-Alone** and the **B26WST-Cluster**, three Tempest-accredited microcomputer workstations based on Burroughs Corp. B25 microcomputers.

The B26WST workstations are built around the Intel Corp. 80186 microprocessor. The B26WST-Master supports a 10M-byte fixed disk, one 630K-byte floppy disk and up to 1,024K bytes of memory. The B26WST-Stand-Alone supports two 630K-byte floppy disks and up to 1,024K bytes of memory, and the B26WST-Cluster supports up to 1,024K bytes of memory.

The B26WST can be clustered in configurations of up to six workstations sharing data, printing and communications resources. They support BTOS, Microsoft Corp. MS-DOS and Digital Research, Inc. CP/M 86 operating systems; Burroughs B25 software; and Basic, Cobol, Fortran and Pascal programming languages.

Prices are $9,478 for B26WST-Master, $7,973 for B26WST-Stand-Alone and $7,077 for B26WST-Cluster.

System Development, 7925 Jones Branch Drive, McLean, Va. 22102.

■

Comark Corp. has unwrapped an industrial NEMA 4 microcomputer called **Dac Pac**.

The product provides three standard microprocessors: an Intel Corp. 8088 CPU, a Zilog, Inc. Z80 for display processing and an Intel 8048 for keyboard processing. The Intel 8087 for math processing and 8089 for I/O processing are optional.

Dac Pac contains up to 16 sockets for random-access memory or erasable programmable read-only memory, battery backup, time of day, 12 programmable counters/timers, 16 interrupts, 40 I/O ports, four RS-232/449 serial ports and four 8-bit system bus expansion sockets.

Dac Pac costs $2,995.

Comark, P.O. Box 474, 93 West St., Medfield, Mass. 02052.

Communications

Dialogic Corp. has introduced the **Audio Services Package**, designed to enable users of IBM's Personal Service/PC software to create and review audio messages and to forward voice files to others using a network.

The Audio Services Package was designed for the IBM Personal Computer, Personal Computer XT, AT or 3270 Personal Computer running Personal Service/PC. It consists of a Dialog/1 voice I/O expansion board, Personal Voice Messenger software and a telephone handset interface adapter used to connect a modular telephone handset to the Dialog/1 for record and playback capabilities.

The Audio Services Package costs $350.

Dialogic, 60 Baldwain Road, Parsippany, N.J. 07054.

■

The Software Link, Inc. has announced an enhanced version of **Lanlink** that runs under IBM's PC-DOS 3.1 operating system.

Using the IBM Personal Computer's standard RS-232 serial port, Lanlink allows the user to set up a server micro or to daisy chain micros.

The enhanced version coordinates multiuser access to the central file, with the use of the new DOS Share command. In addition, a Swap command allows users with multiple printers to define more easily which printer is being accessed.

Enhanced Lanlink costs $495 for the server micro and $195 for each satellite workstation.

The Software Link, Suite 632, 8601 Dunwoody Place N.E., Atlanta, Ga. 30338.

Storage

Kustom Electronics, Inc. has added the **Sunflower MS 19 IR** to its line of removable hard-disk systems.

The MS 10 IR is an internal 10M-byte removable hard-disk kit designed specifically for the IBM Personal Computer, Personal Computer XT, AT and AT&T PC 6300. It is transparent to IBM's PC-DOS and Microsoft Corp.'s MS-DOS.

The product costs $2,245, including interface cable, power supply, documentation and controller board.

Kustom Electronics, 8320 Nieman Road, Lenexa, Kan. 66214.

Printers/Plotters/Peripherals

TAT Graphics Group, Inc. has announced the **Sextant Color Print Feature**, a software driver package that provides a method of creating inexpensive, high-resolution 16-color, 8½- by 11-in. overhead transparencies and prints.

The Sextant Color Print Feature supports the IBM Color Printer, the Dataproducts Corp. 8072, the Advanced Matrix Technology, Inc. 250 and the Fujitsu America, Inc. M333C. It prints 800 by 600 dot/in. in 16 colors from a palette of 4,096.

The package costs $150.

TAT Graphics Group, Building E, 1270 Lawrence Station Road, Sunnyvale, Calif. 94089.

■

Numonics Corp. is offering the **Model 5624R** multipen plotter for personal computers that accepts C- and D-size roll paper in addition to standard cut-sheet paper so that sheet-to-sheet setup is not required.

The Model 6624R provides a grit roller transport system and a speed of 13¾ in./sec. diagonally with 0.3% accuracy, a spokesman claimed.

Functions include commands for vectors, circles, arcs, curve fitting, the full set of ASCII characters, 16

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NEW PRODUCTS

symbols including bar and character symbols, axes, hatching, pen location coordinates, status and alpha controls.

The plotter can interface to most microcomputers including the IBM Personal Computer and Texas Instruments, Inc. Professional Computer, according to the spokesman.

Prices start at $8,000.

Numonics, 418 Pierce St., Lansdale, Pa. 19446.

■

Corporate Data Sciences, Inc. has upgraded its **CDS 2300 laser printer** to include 19 resident forms, a spreadsheet graphics mode compatible with Lotus Development Corp.'s 1-2-3 and native graphics mode programmability.

The graphics spreadsheet mode lets users combine the printer's 300 dot/in. resolution with 1-2-3 graphics. Native mode allows users to program features such as reverse block printing and polygon fills with a range of patterns and dot-dash-line capability to create forms or other graphics.

Nineteen read-only memory-based fonts and five type styles are supplied in sizes down to six-point type.

Designed to work with the IBM Personal Computer XT and AT, the CDS 2300 costs $5,995.

Corporate Data Sciences, Suite 102, 2560 Mission College Blvd., Santa Clara, Calif. 95054.

■

The **Legend 808** dot matrix printer offering 100 char./sec. draft speed and near-letter-quality print at 50 char./sec. is out from **Cal-Abco Co.**

The printer provides nine-wire square-dot technology, a 95-char. ASCII set with ascenders and descenders plus seven programmable printing pitches. Four external switches allow users to toggle print mode, pitch, paper out detect and remote programming.

Other features include standard friction and tractor feed accommodating 4-in. to 10-in. paper and bit image graphics capability.

The printer costs $199.

Cal-Abco, 6041 Variel Ave., Woodland Hills, Calif. 91367.

■

NEC Home Electronics, Inc. has increased the size of its **PC-8401A-LS Portable Office LCD** to 80 by 16 char. on a 9½- by 3-in. screen.

Resolution remains unchanged at 480 by 128 dots.

The PC-8401A-LS costs $999.

NEC Home Electronics, Personal Computer Division, Suite 10, 700 Nicholas Blvd., Elk Grove Village, Ill. 60007.

Board-level devices

Advanced Logic Systems, Inc. has announced two memory boards, **ADD-RAM 64** and **ADD-RAM 256**, which reportedly add 64K bytes and 256K bytes of memory to the Apple Computer, Inc. Apple IIe micro.

The two memory boards are compatible with Apple's Prodos operating system and cost $99 and $199, respectively. The company will upgrade customers' systems to 256K bytes from 64K bytes for $129.

Advanced Logic Systems, 1195 Arques Ave., Sunnyvale, Calif. 94086.

■

National Software Associates, Inc. has announced a synchronous modem plus a synchronous data link control communications interface adapter, called **Adaptmodem**, combined on a single personal computer plug-in card.

The modem portion of the board features AT&T 201 compatibility; IBM Personal Computer, Personal Computer XT and AT bus compatibility; autodial; autoanswer; and communications speeds up to 2,400 bit/sec.

The Adaptmodem board was designed for use with three of National Software Associates' emulation software packages. AdaptSNA RJE is an IBM 3770 emulator. AdaptSNA 3270 is an IBM 3270 emulator, and AdaptSNA PCcom allows a central personal computer to be used in a network control center.

The series runs on an IBM Personal Computer, Personal Computer XT, AT or compatible with 192K bytes of memory and IBM PC-DOS Version 2 or later.

AdaptSNA RJE with Adaptmodem and AdaptSNA 3270 with Adaptmodem cost $1,380. PCcom with Adaptmodem costs $1,270.

National Software Associates, 19491 Sierra Soto, Irvine, Calif. 92715.

■

New Media Graphics Corp. has announced the **PC-Graphover/6300** plug-in graphics board set for the AT&T PC 6300 micro.

The PC-Graphover/6300 allows a single monitor to serve the dual purpose of high-resolution color graphics display as well as system console for the AT&T PC 6300.

The PC-Graphover/6300 offers 640- by 400-pixel resolution in up to 4,096 simultaneous colors.

Prices start at $1,990.

New Media Graphics, 279 Cambridge St., Burlington, Mass. 01803.

■

Emulex Corp. has introduced the **Persyst Supercharger**, a combination high-speed Intel Corp. 8086 microprocessor chip and 512K-byte high-speed 16-bit memory board for the IBM Personal Computer.

The 8086 processor chip on the Supercharger board will run at either 9.54 MHz or 4.77 MHz, selectable by

Continued on page 102

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NEW PRODUCTS

Continued from page 101

the user with a switch on the back panel or with software.

The Supercharger board is compatible with most IBM Personal Computer operating systems, applications software and peripherals.

It is priced at $995.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

■

Everett/Charles Marketing Services, Inc. has announced the **PC Turbocharger**, an enhancement board for the IBM Personal Computer and Personal Computer XT that reportedly increases processing speeds.

The PC Turbocharger replaces the Intel Corp. 8088 central processor in the IBM Personal Computer or XT with an Intel 8086 central processor. It includes an Intel 8088 emulation mode for timing-sensitive programs.

Features include 640K bytes on-board random-access memory (RAM); compatibility with interpretive programs written in IBM Basica; RAM disk; and print-spooling and disk-caching utility software.

The suggested list price is $1,295.

Everett/Charles, 6101 Cherry Ave., Fontana, Calif. 92335.

■

Parallax Graphics, Inc. is offering the **1200-PC series** and the **600-PC series** user-microprogrammable graphics coprocessors for the IBM Personal Computer AT bus.

The 1200-PC series provides 1,280- by 1,024-pixel 60Hz noninterlaced display, up to 2,048- by 2,048- by 8-bit addressable memory and up to 25M pixel/sec. drawing performance.

Maximum block image transfer speed and squeeze/expand function speed are each 12M pixel/sec., while raster operations occur at up to 5M pixel/sec.

The 600-PC series offers 640- by 480-pixel 30Hz interlaced or 60Hz noninterlaced display plus up to 1K- by 1K- by 32-bit or 2K- by 1K- by 16-bit addressable memory. Maximum drawing performance, block image transfer and squeeze/expand are each 12M pixel/sec.

Both the 1200-PC and 600-PC series feature user-programmable 12-MHz bit- slice processor, on-board tablet/mouse support, Graphical Kernel System and video display input support plus programmable memory organization and display format. In addition, both coprocessor families can emulate IBM Personal Computer graphics via a monochrome, color or extended graphics adapter.

Drawing modes are said to include select pixel or bit-plane memory organization, load bit-plane mask, load/select opaque table, load/select read map, load/enable SRC/DST X and Y translation registers, and load/enable clipping window.

Prices are $4,500 for the 600-PC and $6,000 for the 1200-PC.

Parallax Graphics, 1095 E. Duane Ave., Sunnyvale, Calif. 94086.

■

PC-Slave, a 16-bit single-board processor that allows users to add up to 31 workstations to an IBM Personal Computer, Personal Computer XT, AT or compatible processor has bowed from **Advanced Digital Corp.**

PC-Slave is an 8-MHz board containing an Intel Corp. 8088 CPU, 256K bytes of bank-selectable dynamic random-access memory, PC Bus interface and two serial ports. When plugged into the PC Bus, the PC-Slave can make a dumb terminal act like a second personal computer.

With PC-Slave and the vendor's RTNX Executive software to run two or more users, the original personal computer becomes the master processor that shares disks, peripherals and data with slaves. Advanced Digital's PC-Exbus expansion chassis can accommodate up to 12 PC-Slave processor boards. RTNX Executive software is said to permit PC-Slave to run Microsoft Corp. MS-DOS with IBM PC-DOS emulation plus provide file and record locking.

PC-Slave costs $995 in single quantities.

Advanced Digital, 5432 Production Drive, Huntington Beach, Calif. 92649.

■

Tripas Technologies, Inc. has announced a single-board controller for IBM Personal Computers and compatibles, called **PCChannel**, that allows terminal and workstation users on local-area networks to run IBM Personal Computer software.

PCChannel allows terminals and workstations to become the user's personal computer console. It supports the Digital Equipment Corp. VT100, VT220 and IBM 3278 terminals as well as workstations with VT100 emulation.

PCChannel is RS-232C compatible. The RS-232C port operates at up to 19.2K bit/sec.

PCChannel costs $595.

Tripas Technologies, 37053 Cherry St., Newark, Calif. 94560.

■

Macdasher, a Data General Corp. terminal emulator for the Apple Computer, Inc. Macintosh, was released by **Kaz Business Systems, Inc.**

Macdasher simulates the operation of a DG D210 terminal through the Macintosh's serial ports. It supports D210 screen attributes and provides printer pass-through plus file transfer capabilities.

Function keys and cursor controls are supported through pull-down menus and keyboard combinations. Macdasher can transfer files to and from the host computer.

The terminal emulator costs $59.

Kaz Business Systems, 10 Columbus Circle, New York, N.Y. 10019.

Training America's Leaders

How General Electric Information Services Company Cut Training Unit Costs by 70 Percent

"Computer-based training (CBT) made sense to us when it came to expanding training," says Ruanne Pengov, Vice President and General Manager of Application Marketing Operation for General Electric Information Services Company, "so we evaluated major CBT vendors."

"We evaluated all CBT vendors and chose Crwth."

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Also unique is Crwth's Unlimited Access Agreement, which allows

Ruanne Pengov, Vice President and General Manager of Application Marketing Operation for General Electric Information Services Company

customers to use all courses, as many times as necessary, for one annual fee.

Another plus, according to Pengov: consistent style and quality of the courses, all produced under the direction of best-selling data processing author Gary DeWard Brown.

"I assumed the best CBT would be the most expensive. I was wrong."

"Crwth's Unlimited Access Agreement allowed us to save money when compared to both conventional stand-up and mixed-media instruction," Pengov explains.

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"The quality of [illegible] Crwth is a [illegible]"

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NEW PRODUCTS

Auxiliary equipment

Insight Development Corp. has announced the **Lasercontrol** system, which reportedly allows the Hewlett-Packard Co. Laserjet printer to emulate most printers from other leading vendors.

Lasercontrol is available as software for the IBM Personal Computer series; a circuit board for IBM and Texas Instruments, Inc. personal computers; or a stand-alone box.

Each product allows the Laserjet to emulate other printers, including the Epson America, Inc. MX-80 with Graftrax Plus; the Diablo Systems, Inc. 630; the NEC America, Inc. 5510 and 7710; and the Qume Corp. Sprint V.

The Lasercontrol 100 software diskette runs on the IBM Personal Computer, Personal Computer XT and AT and the TI Professional. It costs $150.

The Lasercontrol 200 board, also for IBM and TI micros, is said to print 25% to 36% faster than the 100 software and to use no system memory. It costs $499.

The Lasercontrol 300 is a stand-alone box reportedly compatible with Digital Research, Inc. CP/M-based micros as well as minis, mainframes, networks and dedicated word processors equipped with a Centronics Data Computer Corp. parallel or RS-232C serial port. It is priced at $749.

Insight Development, 2005 Vine St., Berkeley, Calif. 94709.

■

Polytel Computer Products has announced the **Keyport 60** touchpad, sized to fit along the top of a regular keyboard, that provides 60 additional user-programmable function keys.

The Keyport 60 connects to any IBM Personal Computer, Personal Computer XT, AT or true compatible through an analog control adapter. Each of the 60 keys can be defined on-line in both regular and shift modes, providing 120 available macros. Each key can be labeled by the user with words, symbols or illustrations.

The Keyport 60 costs $99.

Polytel, Suite 310, 1250 Oakmead Pkwy., Sunnyvale, Calif. 94086.

■

Digital Vision, Inc. has announced **Computereyes**, a version of its video acquisition system for Apple Computer, Inc. Apple IIc computers.

Computereyes plugs into the Apple IIc's Serial 2 and joystick ports and connects to any standard video source. A black-and-white image is acquired in less than six seconds and the multiscan mode can be used to provide realistic gray-scale images.

Computereyes requires an Apple IIc or compatible with Applesoft in random-access memory (RAM) or read-only memory, 48K RAM, one disk drive and DOS 3.3.

Computereyes costs $129.95.

Digital Vision, Suite 2, 14 Oak St., Needham, Mass. 02192.

■

Inmac Corp. has introduced **6-ft cables** for the Apple Computer, Inc. Macintosh and Apple IIc.

The cables can attach the Apple IIc or the Macintosh to modems and serial printers. Inmac's printer cables are said to be compatible with any RS-232 serial printer. The modem cables can be used with any Hayes Microcomputer Products, Inc.-compatible 300 or 1,200 bit/sec. modem. The cables cost $29.95 each.

Inmac, 2465 Augustine Drive, Santa Clara, Calif. 95054.

■

PC Security Enterprises, Inc. has announced a key-operated security lock, **the Powerlock 1000-PC**, for the IBM Personal Computer and Personal Computer XT.

The Powerlock 1000-PC restricts access to the computer by replacing the on/off switch with a keyed lock. It offers master keying and three security levels. It costs $69.95.

PC Security Enterprises, P.O. Box 510, Newton Centre, Mass. 02159.

■

Data Spec, a division of **Alliance Research Corp.**, has introduced the **Printer Jack**, a serial-to-parallel interface for the Apple Computer, Inc. Apple IIc.

The Printer Jack interfaces the serial-only printer port of the Apple IIc to a Centronics Data Computer Corp.-type parallel port, enabling the Apple IIc to connect to most parallel printers. On one end of the unit there is a cable with a 36-pin Centronics-type connector that connects to the printer. On the other end is a 5-pin DIN connector that connects to the Apple IIc's serial printer port. The Printer Jack costs $87.95.

Data Spec, P.O. Box 4029, 20120 Plummer St., Chatsworth, Calif. 91313.

■

TAT Graphics Group, Inc. has announced that its **Sextant** dual-mode graphics display subsystems now support Autodesk, Inc.'s Autocad microcomputer computer-aided design system.

Sextant systems provide dual-mode operation for supporting low-resolution applications such as Lotus Development Corp.'s 1-2-3 plus high-resolution applications like CAD.

Prices for Sextant subsystems including the Galaxy display controller and a monitor range from $1,995 for a 640- by 640-pixel resolution system to $4,895 for a 1,024- by 768-pixel system.

TAT Graphics Group, Bldg. E, 1270 Lawrence Station Road, Sunnyvale, Calif. 94089.

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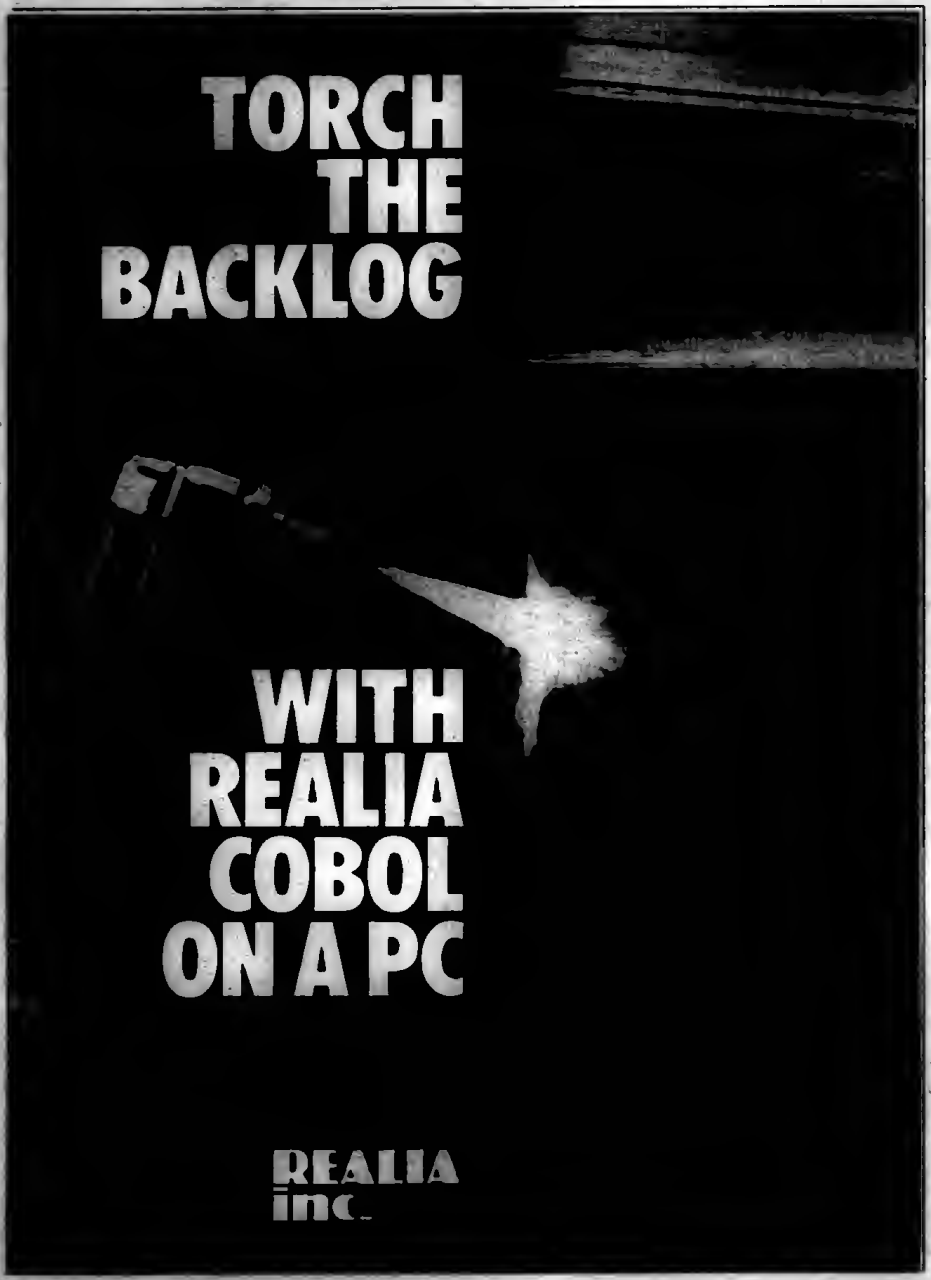

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Model _____

CWD1

From page 104

Auxiliary equipment

Microfield Graphics, Inc. is offering the microprogrammable **T4 Color Graphics Controller**, which provides bit-slice graphics for the IBM Personal Computer AT.

The T4 controller is said to provide 1,024- by 800-pixel resolution and writing speeds of more than 1 million pixel/sec. A bit-slice emulation feature allows a user to run programs like Lotus Development Corp.'s 1-2-3 and Micropro International Corp.'s Wordstar on these high-resolution displays, according to the vendor.

A Microfield Virtual Device Interface (MVDI) connects the T4 and the AT, allowing users to draw device-independent graphics and to make previously developed graphics applications portable from other computers.

Also available are T4 Development Tool Kits that include an AT; the T4 Color Graphics Controller running a Microsoft Corp. MS-DOS editor; a T4 simulator; MVDI source code; bit-slice source code; microcode assembler, linker and loader; debug tools; and programming guides.

The T4 Color Graphics Controller costs $3,200. Development kits cost $100,000, and the MVDI sells for $16,000.

Microfield Graphics, Suite 161, 8285 S.W. Nimbus Ave., Beaverton, Ore. 97005.

■

Jones Futurex, Inc. has unveiled **Autocrypt I**, an electronic security program for the IBM Personal Computer and compatible computers.

Called Autocrypt I, the software works with the Jones Futurex Encryptor 300 series of data encryption standard processors that store the encryption key. Because the key is not stored on disk or in internal computer memory, it is not subject to tampering or deciphering, the vendor claimed.

Data transmitted to and from disks can be encrypted at 12K byte/sec., according to the vendor.

Autocrypt I costs $95.

Jones Futurex, 9700 Fair Oaks Blvd., Fair Oaks, Calif. 95628.

■

Isolation Systems, Inc. has announced the **Access Control Module**, a microcomputer security package for the IBM Personal Computer, Personal Computer XT, AT and compatible systems.

The Access Control Module offers two levels of security: It limits use of the system to individuals with authorized passwords, and it limits access by using data encryption.

Aspects of the product's password management reportedly include storing passwords in encrypted form, archiving up to 30 passwords to prevent reuse or duplication, time delay on password violation and automatic lockout after a maximum password violation count.

The package can be installed without loading any dedicated applications software and will not interfere with IBM PC-DOS-compatible applications programs, the vendor claimed.

Isolation Systems, 26 Six Point Road, Etobicoke, Ont., Canada M8Z 2W9.

■

PC Cooler, a cooling system for the IBM Personal Computer XT and compatible computers, is available from **B. H. Thrasher & Associates.**

PC Cooler uses two existing mounting holes in the IBM chassis as well as the power outlet normally used by the monochrome monitor. The monitor connection moves to an auxiliary outlet on PC Cooler, a spokesman noted.

PC Cooler operates on ac power, so it adds no load to the dc power supply, according to the spokesman.

Using an axial fan, the system is said to increase the flow rate of cooling air through the chassis by more than 350% without increasing the noise level significantly above that of a typical hard disk drive.

PC Cooler delivers a maximum 50% reduction in the temperature rise of the chassis, the internally mounted integrated circuits and disk drives, the spokesman claimed.

PC Cooler is priced at $49.50.

B. H. Thrasher, 3996 N.W. Hield Road, Palm Bay, Fla. 32907.

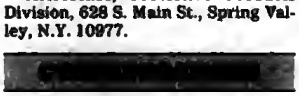
■

Microsense, Inc. has announced **Microbug Model II**, an upgraded version of its computer security system that links into central alarm systems to protect computers from unauthorized access.

The product uses motion-activated sensors that attach and protect up to five computer components. When a component is moved, a 92db alarm sounds to alert central security of a possible theft.

A key-activated system controls computer access, and a battery backup guards against tampering and power failures. Microbug II sells for $295.

Microsense, Protective Products Division, 628 S. Main St., Spring Valley, N.Y. 10977.



Voice/data communications

Datagrobe, Inc. has announced the **4-Talk System**, which allows alternate voice/data communications over four-wire leased lines.

The 4-Talk System consists of an automatic switching unit and a modified four-wire telephone. The product automatically switches the leased line from the modem to the four-wire

Continued on page 110

FOR OEM AND VAR USERS

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M68MX: Sample price—$1,995

M68: Sample price—$3,235

UNIBOX: Sample price—$4,695

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Los Angeles: 723 W. 7th St., Los Angeles, CA 90017; 213-622-0244.
Sord Computer Corp. Tokyo, Japan

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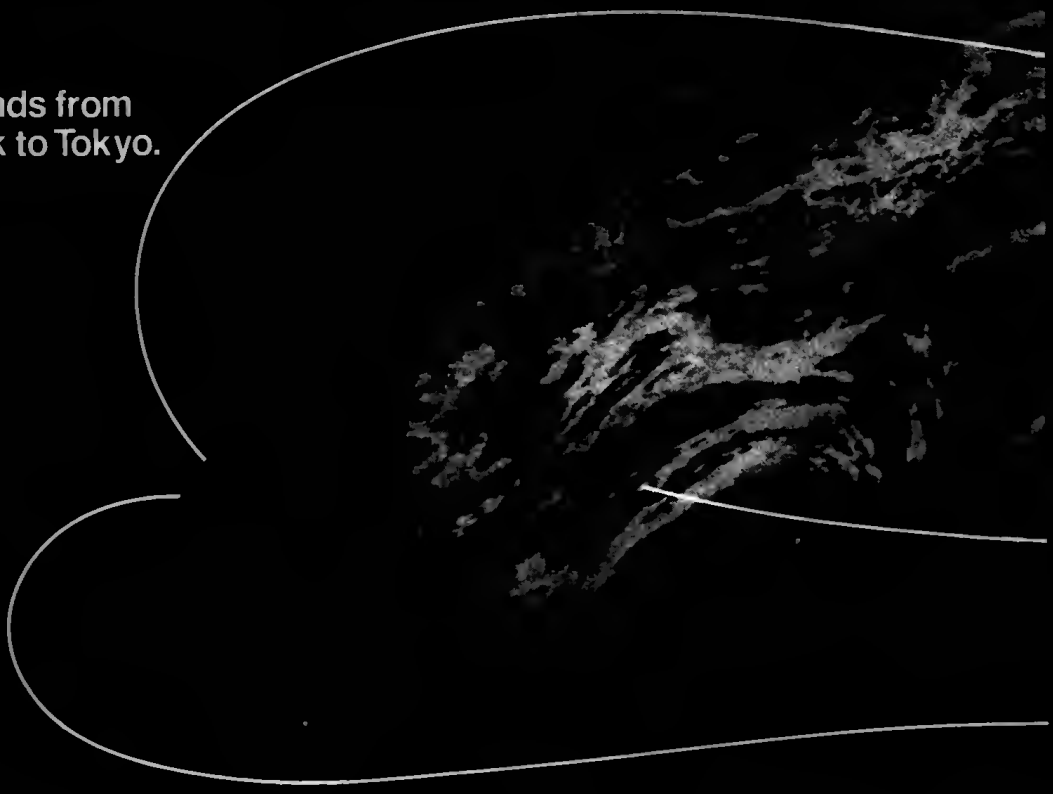

XEROX

keystrokes. It stores documents electronically, can forward messages automatically, and acts as an electronic mail terminal. Remote users can even call a FaxMaster hub and retrieve documents stored in their mailboxes. And it keeps a meticulous accounting of every activity, delivery, and pickup, worldwide.

FaxMaster automatically dials the numbers. If it reaches a busy signal, it will continue down the distribution list, then redial until it gets through. It can even transmit to multiple locations at night or on the weekend when phone rates are lowest.

With the G1/G2 analog compatibility option, the Xerox Telecopier 495-I can communicate with slower speed facsimile terminals. The RS-232-C option lets it convert and print ASCII encoded information from many other computers.

Xerox also offers a desktop digital facsimile terminal, the Xerox Telecopier 295. It's easy to operate, and will transmit your entire message in 25 seconds or less.

Both the 495-I and 295 are compatible with other makes of facsimile terminals, and workstations that are part of Team Xerox.

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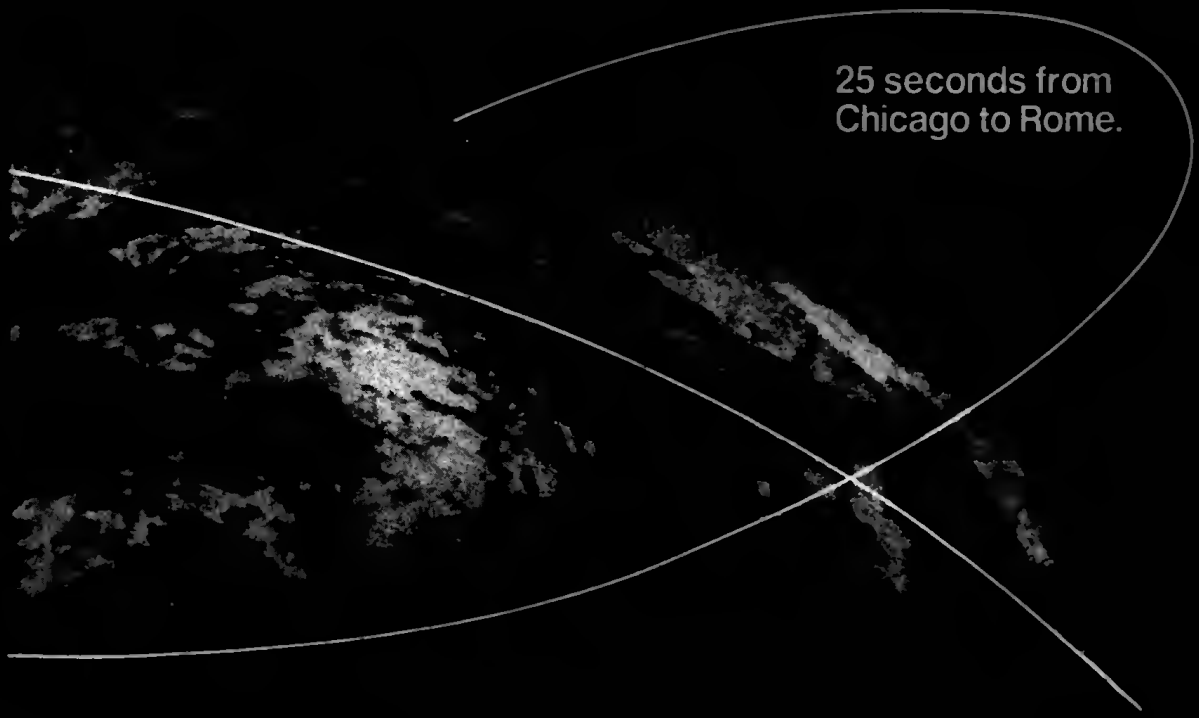

25 seconds from
Washington to Sydney.

Continued from page 106

telephone when voice communications is desired. Voice calls are initiated by dialing a two-digit code. Audible and visual alarms indicate incoming calls.

The system costs $450, including one automatic unit, four-wire phone and modular interconnect cord.

Dataprobe, 110 W. Palisade Blvd., Palisades Park, N.J. 07650.

■

Wizard Computer Products has announced **Wizard Talk**, a computer-generated voice output system for converting text to speech.

Wizard Talk is an option to Wizard Mail designed to allow users to have computer-based mail messages read with only a Touch-Tone telephone. It is a turnkey system that includes software, Digital Equipment Corp.'s Dectalk voice synthesizer and Wizard's own protocol converter.

The price of Wizard Talk when Wizard Mail is already installed is $6,700. When both are installed at the same time, the total cost is $9,700. The annual maintenance fee is $185.

Wizard Computer Products, P.O. Box 1867, Greenville, S.C. 29602.

Software

Gejac, Inc. is offering a version of **Hasp**, its communications package for Digital Equipment Corp. VAX-11 computers, which runs on the Microvax.

Hasp reportedly connects mainframes, networks and minicomputers for bulk transfers.

This Hasp version supports DEC's DPV-11 communications board, which uses direct memory access capabilities at speeds up to 56K bit/sec. Hasp is supported also on the DUV-11 synchronous interface.

The Microvax version can be licensed for $4,000.

Gejac, P.O. Box 188, Riverdale, Md. 20737.

Multiplexers/modems

The **Ethermodem** line of products that transform a baseband Ethernet local-area network into a broadband network have been announced by **Chipcom Corp.**

The line includes two-port modems for single- and dual-cable systems and frequency translators for single-cable systems. The two-port modems support a 10M bit/sec. transmission speed, are equipped with collision detection capabilities, comply with IEEE 802.3 standards and are compatible with IBM's PC Network.

Baseband users can convert to broadband by removing a cable from a baseband transceiver and inserting it into an Ethermodem modem.

The product's diagnostics capabilities check circuits by use of a built-in packet generator that compares data on a bit-by-bit basis. A digital loop-back test is standard.

The two-port modem is $4,250. The frequency translator is $4,500.

Chipcom, 31 Thorpe Road, Needham, Mass. 02194.

■

Lockheed-Getex, a division of Lockheed Corp., has introduced **GTX-100 Security Modem**, a security subsystem designed to prevent computer intrusion via telephone lines.

The product offers a sequence of call-back and password acceptance for ensuring user authorization. Features include three security levels, memory for 16 user passwords and an audit trail of the last 16 attempts to call in, successful or failed.

The modem offers full-duplex, asynchronous transmission at 300 or 1,200 bit/sec. It is direct connect, AT&T 212A compatible and features autodial/autoanswer, speed-dialing, Touch-Tone or pulse dialing and RS-232C compatibility.

A Remote-On option allows callers to turn their computers on and off from different locations while maintaining security. The modem costs $995 or $1,195 with the Remote-On.

Lockheed-Getex, Suite 945, 1100 Circle 75 Pkwy., Atlanta, Ga. 30339.

■

Everett/Charles Marketing Services, Inc. is offering **Super Modem 1200**, a communications system for use with RS-232C-compatible computers and terminals.

The Super Modem 1200 performs at 300 or 1,200 bit/sec., automatically adjusting to the transmission rate set in the computer. It is AT&T 103- or 212A-compatible and features autodial/redial, Touch-Tone, rotary dial pulse dialing and on-line operation in full- or half-duplex modes.

The Super Modem 1200 costs $299.

Everett/Charles, 6101 Cherry Ave., Fontana, Calif. 92355.

■

Gammalink, Inc. has announced **Gammamodem**, a stand-alone version of its synchronous modem card that links IBM System/34, 36 and 38 mainframes and remote IBM Personal Computers, Personal Computer XTs and ATs at 9.6K bit/sec.

Gammamodem features autodialing of a preprogrammed number and automatic fallback to 7.2K and 4.8K bit/sec. as required. It conforms to the CCITT V.29 specifications and works over ordinary dial-up lines.

Gammamodem costs $1,995.

Gammalink, 2452 Embarcadero Way, Palo Alto, Calif. 94303.

■

Data General Corp. has announced **Model 5400GP**, an interface for high-speed data transfer between DG Eclipse and Eclipse MV/Family computers and external devices.

The Model 5400GP General Pur-

Continued on page 112

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NEW PRODUCTS

Continued from page 110

pose Burst Multiplexer Channel interface is fully supported on DG's AOS/VS operating system. It includes a 32-bit AOS/VS software driver. It can operate at speeds of up to 7M bit/sec.

The 5400GP is priced at $7,500.

DG, Rt. 9, Southboro, Mass. 01772.

Local-area networks

Turbo Deanet, a local-area network that interconnects 8-bit and 16-bit Digital Research, Inc. CP/M programs and Microsoft Corp.'s MS-DOS programs, is available from the **Destek Group**.

Turbo Deanet runs with the firm's Turbodos operating system and includes hardware and software for connecting S-100 and IBM Personal Computer bus computers.

Turbo Deanet provides the carrier-sense multiple access/collision avoidance network access scheme and single-board communications.

The local-area network can be upgraded to broadband or to fiber optic. Prices start at $650, which includes hardware, plus $100 for a communications software site license.

Destek Group, 830 E. Evelyn Ave., Sunnyvale, Calif. 94086.

Test equipment

ECC has introduced the **Communications Analysis Terminal Model CAT-32**, an analyzer that automatically sequences through all the normal RS-232C conditions and identifies the proper protocol and handshake used in an echo-mode environment.

The CAT-32 has a display that provides information on the data rate, the number of stop bits, parity, the number of data bit/char. and whether XON/XOFF handshake is required. It has eight LEDs that indicate the switching of the transmit and receive lines and the presence of the handshake requirements.

A manual mode allows the CAT-32 to be transparent while allowing the selection of port parameters. The manual mode provides repeat transmitting, ensuring transmission of continuous predefined data plus an activation port capability to identify RS-232C ports requiring special characters and/or codes to activate the port.

The CAT-32 is priced at $2,985.

ECC, 4482 Sunburst Drive, Oceanside, Calif. 92056.

Auxiliary equipment

Backus Data Systems, Inc. has unveiled **Dialsafe SL**, a data security system that protects a single modem line and one host computer port.

The system protects single dial-in ports with mainframes, minicomputers and microcomputers against unauthorized users entering computer systems via dial-up maintenance ports.

As users call in, Dialsafe SL intercepts the calls and requests identification and a password.

When validated, the information is matched to a previously programmed phone number, and the unit dials the user back to establish normal computer connection.

The Dialsafe SL security system lists for $495.

Backus Data Systems, Suite 110, 1440 Koll Circle, San Jose, Calif. 95112.

Paradyne Corp. has unveiled the **Info-Lock Model 2811-11** link encryptor, which offers automatic dial key management.

The Info-Lock 2811-11 monitors Electronic Industries Association lines to sense call establishment and disconnect and automatically performs key management functions. When configured for the dial environment, a new session key is established and erased for each connection.

Info-Lock protects data transmitted over microwave, cable and satellite facilities.

It can be programmed to operate on synchronous links at rates up to 9.6K byte/sec. and asynchronous links up to 19.2K byte/sec.

Users can program the encryptor to function as a host or remote unit in point-to-point, multipoint or dial network environments. The device is transparent to the user, even in dial applications.

Info-Lock encrypts data using the National Bureau of Standards Data Encryption Standard algorithm as specified in Federal Information Processing Standard 46.

The Data Encryption Standard encryption process depends on a secret key variable that specifies the formula for scrambling data.

Model 2811-11 can generate, store and use up to 140 keys. Levels of key security include identification codes and multiple-courier distribution. Penetration of the unit zeros key variables and results in an audible alarm.

The Info-Lock Model 2811-11 costs $2,900.

Paradyne, P.O. Box 1347, 8550 Ulmerton Road, Largo, Fla. 33540.

Turnkey systems

Brock Control Systems, Inc. has announced **Sales Activity Manager**, a multiuser turnkey computer system designed to automate the activities of sales organizations.

Sales Activity Manager was developed for the AT&T 3B line of AT&T Unix-based computers. It incorporates proprietary software and voice/data terminals to provide a telemarketing and management system. It allows up to 44 users to input sales prospecting information into a centrally located relational data base. The information can be retrieved to produce reports, forms and forecasts.

INTELLIGEN

It takes more than a PC to make a 3270 network work.

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The Telex 1260 is the low cost choice for users seeking IBM XT compatibility and AT performance. Telex's 1280 runs up to 30% faster than the AT and supports both AT hardware and software. Together the 1260/1280 offer a wide selection of memory, storage, peripheral and expansion options to provide for today's needs as well as tomorrow's growth. And they both support a choice of 3278 or AT style keyboards.

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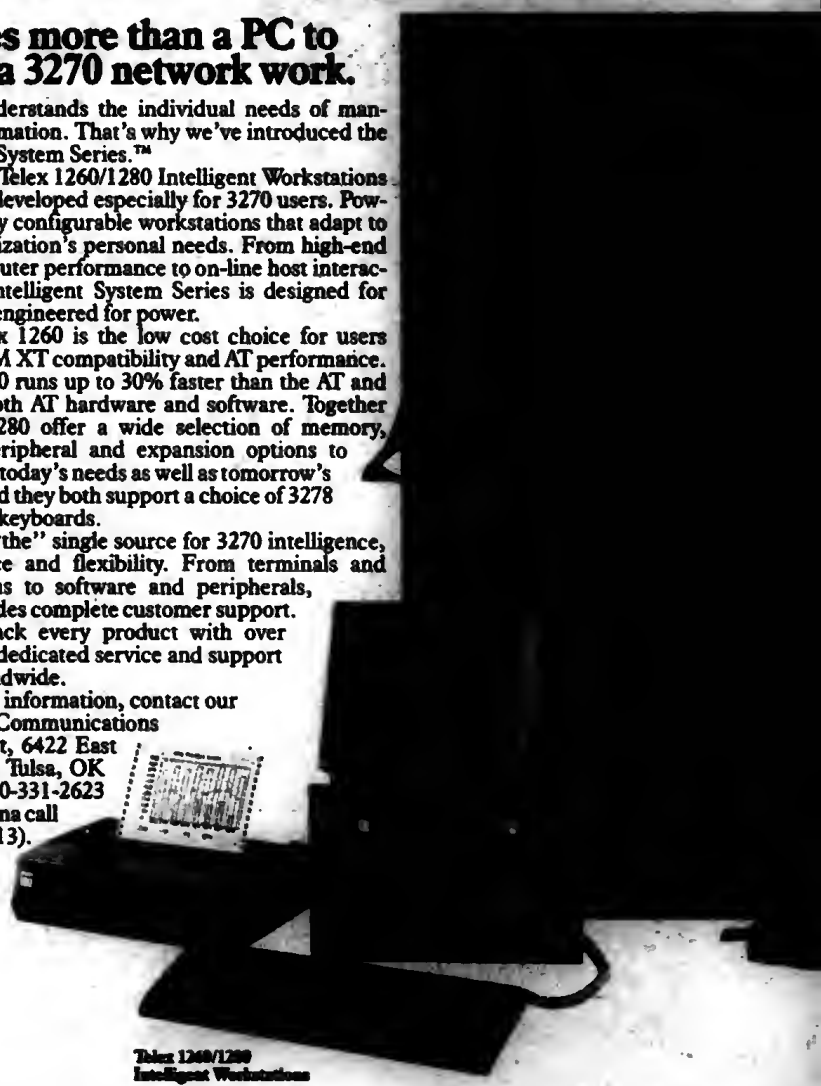

Telex 1260/1280 Intelligent Workstations

IBM AT and IBM XT are trademarks of International Business Machines.
Telex is a registered trademark of Telex Corporation.

NEW PRODUCTS

Other features include an integral word processor, electronic mail messaging and an on-line laser printer.

Pricing is based on the number of installed users, with costs averaging $3,400 per installed station.

Brock Control Systems, Suite 100, 1600 Parkwood Circle, Atlanta, Ga. 30339.

Terminals

Intecolor Corp. has introduced the **Intecolor 3860** color graphics terminal.

The 3860 has a 13-in., 80-char. by 48-line display. It offers a 160- by 192-pixel low-resolution graphics format. The user has a choice of eight foreground colors on eight background colors.

The terminal features a color printer software driver and associated serial I/O port, three character sets, selectable bit/sec. rate and parity plus front-access manual degaussing and brightness control.

The 3860 is priced at $2,195 in quantities of 100.

Intecolor, Intecolor Drive, 225 Technology Park, Norcross, Ga. 30092.

■

Chromatics, Inc. has announced the **CT 1024 Colorgraphic Terminal.**

The CT 1024 was designed to meet the needs of business, computer-aided design and manufacturing, computer aided engineering, mapping, C³I and scientific applications. It features both 1,024- by 1,024-pixel resolution and 512- by 512-pixel resolution switchable bit-map images in a modular 19-in. monitor.

The display can be operated in a 1,024- by 768-pixel resolution, 30Hz interlaced refresh mode or a 512- by 384-pixel resolution, 60Hz noninterlaced refresh mode under program control. It supports nondestructive zoom, pan, blink and graphics primitives in eight or 16 colors.

The CT 1024 Colorgraphic Terminal is priced at $8,495, including a 19-in. raster scan display, detachable 92-key keyboard, RS-232C I/O port, color lookup table and red-green-blue video out port and monitor, in an office environment or rack-mount enclosure.

Chromatics, 2558 Mountain Industrial Blvd., Tucker, Ga. 30084.

■

Lear Siegler, Inc. unveiled ADM 364, a VDT that provides Digital Equipment Corp. VT220 functionality with an alternate keyboard layout.

ADM 364 offers VT220, VT100, VT52 and ANSI X3.64 code compatibility with a Lear Siegler keyboard layout. The layout is based on two of the vendor's general-purpose ASCII terminals — ADM 11Plus and ADM 12Plus. It provides three-level function keys for 15 fixed functions, 15 programmable functions and 15 programmable nonvolatile functions; 80- or 132-col. display; and a 14-in. green or amber screen.

The terminal costs $895.

Lear Siegler, Data Products Division, 901 E. Ball Road, Anaheim, Calif. 92805.

Printers/Plotters

Misco, Inc. has added a printer accessory, called **Printnet**, to its latest direct-mail catalog.

Printnet is a networking printer spooler that allows users to form a printer sharing network with up to 15 computers and 15 printers.

Printnet costs $439.

Misco, One Misco Plaza, Holmdel, N.J. 07733.

■

Ziyad, Inc. has introduced the **Ziyad Model DSF-8**, an electronic sheet feeder for the Wang Laboratories, Inc. LPS8 Laser Printer.

The Ziyad Model DSF-8 adds two paper trays to the single paper tray resident on the Wang LPS8, allowing users to print up to 450 sheets of paper automatically. Paper sizes that can be accommodated range from 7¼ in. by 10½ in. to 8½ in. by 14 in.

The product supports any host system that works with the Wang LPS8 Laser Printer, including VS and the Office Information System.

The Model DSF-8 costs $1,895.

Ziyad, 100 Ford Road, Denville, N.J. 07834.

■

Hetra Computer and Communications Industries, Inc. has released the **Hetra Model 3024**, its first product in a series of laser printer systems.

The Hetra Model 3024, composed of an electronic nonimpact page printing engine and a printer controller, prints at a speed of 24 page/min. It has a print orientation of zero, 90, 180 and 270 degrees and stores up to 60 fonts on-line. It allows font sizes from four to 26 points, has 300 dot/in. density and line drawing capabilities.

Both serial RS-232 and parallel interfaces are offered and many protocols, including IBM Systems Network Architecture/Synchronous Data Link Control and IBM 3274, are also available.

The Hetra Model 3024 system is priced between $20,000 and $30,000, depending on the configuration.

Hetra, 1151 S. Eddie Allen Road, Melbourne, Fla. 32901.

■

Digital Systems, Inc. has released a series of three IBM System/34, 36 and 38 twin-axial compatible band printers, the **Model 5230-01, 5230-02 and 5230-03.**

Model 5230-01 offers a speed of 300 line/min.; Model 5230-02 prints

Continued on page 116

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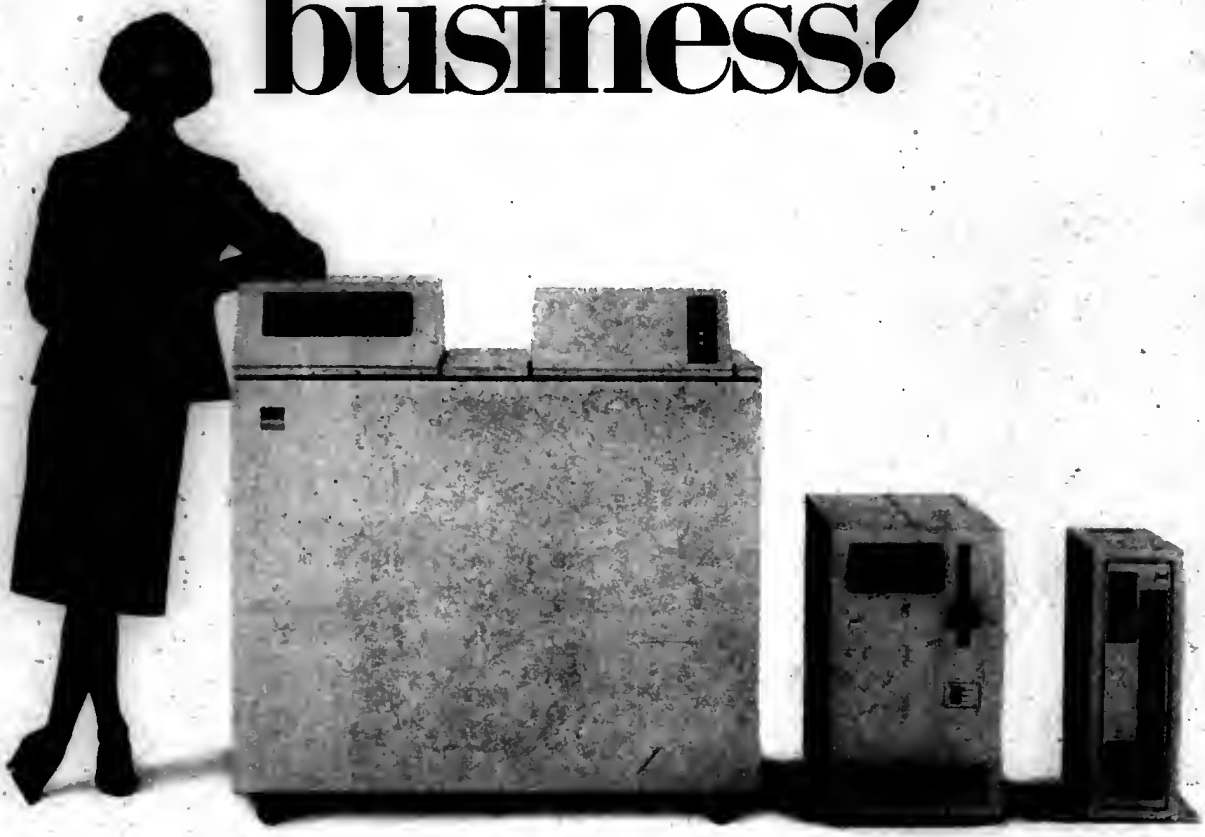

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Although there are three IBM System/36 computers to choose from, they're really a single family. All System/36 printers and displays are interchangeable.

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Any of the System/36 models can be a standalone computer for a small company, a departmental system, or part of a distributed network for a larger company.

The System/36 is a well-rounded business and office computer system with a library of more than 3,000 proven applications covering a wide range of businesses.

For example, IBM software like DisplayWrite/36 and Personal Services/36 provides text processing, calendaring and scheduling, message and mail handling to help you create a hardworking office system.

PC Support/36 lets personal computers access System/36 disk storage and printers.

As a central processor, the System/36 can help pull a company together—it can connect PCs to mainframes. And the communications capabilities of the System/36 allow people throughout an organization to share information and resources to handle almost any job, anytime, from IBM Personal Computers or System/36 terminals.

In addition to its text and office function and its communications capabilities, each System/36 offers business graphics and general accounting applications, making it a truly integrated solution to the problems of running a business.

Introducing the IBM System/36 PC.

This new IBM computer marries the System/36 and the IBM Personal Computer to give you the best of both worlds. With a price starting at $5,995, the System/36 PC is an affordable standalone system for a small business. And it can be used in a larger company where multiple unit installations offer the best solution.

The System/36 PC is made up of a 5364 processor attached to an IBM PC, PC XT or Personal Computer AT* System.* And you can connect up to three more of these personal computers. Or you can connect terminals such as System/36 printers or displays.

The System/36 PC comes with a 1.2 MB diskette drive and either 40 or 80 MB disk storage, depending on your information storage needs:

The System/36 model 5362.

The middle-sized System/36 processor, the 5362 can support up to 22 local IBM Personal Computer terminals and up to 64 remote terminals. With 1 MB of main memory and 120 MB of disk storage, the 5362 is powerful for its size—about as big as a two-drawer filing cabinet. And, you can add memory and additional features with plug-in modules for easy growth.

The System/36 model 5360.

The largest of the System/36 Family, the 5360 has 1.75 MB of main memory, with disk storage capacity up to 800 MB. Working as the computer solution for many businesses, the 5360 can support up to 36 personal computers or local terminals and up to 64 personal computers or terminals remotely.

Easy to use.

All IBM System/36's are easy to use. Over 2,800 "help" screens assist first-time users over any rough spots. They're also easy to install. And they need no special operating environment.

No matter what business you're in, the System/36 Family of processors offers a system that will fit, now and in the future.

To learn more about the IBM System/36 Family, call your IBM marketing representative. Or for an IBM Product Center or authorized IBM remarketer, call 1 800 IBM-2468, ext. 90, LM.

If you're shopping for a business computer, choosing the best system is easier than ever. The hardest part is deciding how much System/36 is right for your business.

IBM

*IBM, Personal Computer AT and PC XT are trademarks of International Business Machines Corporation.

NEW PRODUCTS

Continued from page 113

at 650 line/min; and Model 5230-03 operates at 1,000 line/min.

The 5230 family provides a 64-char. set as standard and an optional 96-char. set. The printers support forms up to 16 in. wide. A built-in diagnostic display lets users identify and correct off-line conditions.

Direct attachment to the IBM System/34, 36 and 38 is through standard twin-axial cable. The printers include a cable-through connector, terminator switch and address switches.

In addition, the units reportedly operate as fully functional IBM 5256 printers with paper-out and paper-jam sensing.

Model 5230-01 costs $9,600; Model 5230-02 costs $11,400; and Model 5230-03 costs $14,400.

Digital Systems, P.O. Box 0974, Waukesha, Wis. 53187.

■

The Model 5210-01 bar code/label printer that is compatible with the twin-axial connection of the IBM System/34, 36 and 38 is available from Digital Systems, Inc.

The Model 5210-01 can print 27 labels per minute or 140 char./sec. Users can specify block letters and line-drawing dimensions.

Bar codes include Code 39, Universal Product Code, Codabar, Interleaved 2 of 5, Plessey M-10, EAN 8 and EAN 13.

The system is said to provide 5,000 hours mean time between failure and a one-year warranty on the print head. Direct attachment to the IBM System/34, 36 and 38 is via standard twin-axial cable. The printer includes a cable-through connector, terminator switch and address switches.

The Model 5210-01 is priced at $6,195.

Digital Systems, P.O. Box 0974, Waukesha, Wis. 53187.

■

Infoscribe, Inc. has added Bar Code 39 print capability to its Model 800 and 1100 dot matrix printers.

The bar code capability is implemented in read-only memory-based firmware that is accessed through an escape sequence from normal print routines. Bar codes can be printed in three densities with two contrast ratios. Print height varies in 0.01-in. increments.

The bar code option costs an extra $80 for each printer model. Users can purchase field upgrade kits for $125 or return their printers to the factory for an upgrade plus printer test and check for $150.

Infoscribe, 1808 Michael Faraday Court, Reston, Va. 22090.

Graphics systems

Xerox Corp. has announced a computer-aided system for mechanical design and drafting called the Xerox Professional Mechanical System (XPMS).

XPMS is designed for use in electronic design and documentation applications. It consists of an Ethernet-linked local-area network of workstations that can share data bases for design integration.

XPMS offers multiple window capabilities providing the functional equivalent of up to seven graphics terminals in a single display. ProCad, a mechanical design and drafting software package, enables XPMS users to add drafting symbols, common geometric elements and construction devices.

A Professional Integrator library allows users to send and receive two- or three-dimensional geometric files written in CAD-system formats and to convert them from one format to another.

Prices range from $20,000 to $75,000, depending on the configuration.

Xerox, Xerox Sq. 006, Rochester, N.Y. 14644.

■

A graphics workstation, the Megastation 3300, which combines the Megatek Whizzard 3300 interactive graphics system and the Digital Equipment Corp. Microvax II 32-bit microcomputer, is available from Megatek Corp.

The Megastation 3300 supports graphics programs that run under the DEC VAX/VMS operating system including electronic or mechanical computer-aided design, simulation, C³I and mapping.

A direct memory access interface is said to provide parallel communications speeds of up to 1.5M byte/sec.

Standard Whizzard 3300 configurations provide a 1,024- by 1,024-pixel resolution, 19-in. monitor, real-time, two-dimensional transformations, keyboard and 16 displayable colors.

Options include a three-dimensional hardware clip and a rotate, scale and translate module for mixing 2- and 3-D graphics displays simultaneously.

Standard Microvax II features include 2M bytes of main memory, a 31M-byte Winchester disk, Ethernet interface, serial port floating-point processor and 800K-byte 5¼-in. dual floppy drive.

Megastation 3300 single-system end-user prices range from $50,000 to $70,000, depending on options, the vendor said.

Megatek, 9645 Scranton Road, San Diego, Calif. 92121.

Office systems

CPT Corp. has announced the Office Dialog System (ODS) 100 member of its CPT ODS family of minicomputers.

The ODS 100 is an AT&T Unix-based system for departmental processing in small to midsize businesses and for departments and other work groups within midsize to larger businesses, the vendor said.

The system can support up to eight workstations. By adding the CPT Open Connection facility that costs $1,000, IBM Personal Computers can be part of the workstation configuration.

On-line storage ranges from 50M to 280M bytes, in addition to the individual storage of each workstation. The ODS 100 supports TTY, IBM 3270 and Digital Equipment Corp. VT52 terminal emulation through a communications package that costs $1,500.

The base price for the single-user CPT ODS 100 is $18,990, which includes 1M byte of main memory, 50M bytes of Winchester disk storage, two RS-232 ports and a 55M-byte ¼-in. tape drive for backup.

To include from two to eight users, an eight-port communications board costs $1,990, and an additional 0.5M bytes of memory that cost $2,490 are required.

CPT, P.O. Box 295, Minneapolis, Minn. 55440.

■

Property Technology, Inc. is offering The Statistics Engine, an integrated hardware and software package that provides statistical analysis and office automation in academic and scientific settings.

The hardware portion is the Charles River Data Sys-

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NEW PRODUCTS

tems, Inc. Universe 32, a machine built around the Motorola, Inc. 68020 semiconductor. Hardware features include a 35M-byte disk, 140M-byte add-on disk, 45M-byte streaming tape, 4M bytes of random-access memory, 12 serial ports and the Unix System V operating system.

Software consists of the Minitab statistical application package, Q-Office word processing and office automation and Unify data base management system.

The price is $49,185, which averages to approximately $4,100 per user, the vendor said.

Property Technology, 90 Windom St., Boston, Mass. 02134.

Power supplies

International Power has introduced two uninterruptible power sources, the IUPS400 and the IUPS650.

The IUPS400 is a 400W, 3.6A model for use with micros. The IUPS650 is a 650W, 5.75A model for use with minicomputers. Ferroresonant transformer design is said to provide a computer-grade sine wave with crystal-controlled frequency and instantaneous backup during blackouts.

The Model IUPS400 costs $1,095, and the IUPS650 costs $1,595.

International Power, Suite 710, 350 N. Lantana, Camarillo, Calif. 93010.

Isoreg Corp. has announced single-phase Isoguard uninterruptible power system (UPS) for computers, process control and instrumentation applications.

A static continuous on-line UPS, Isoguard stores electrical energy in batteries until needed and changes supplied power continuously from ac to dc and back to ac.

The UPS provides stable power to the load within 2% of correct voltage even when power line voltage deviates from normal by 10%, according to a spokesman. A sudden 50% load change is eliminated within 25 msec.

Isoguard is said to tolerate frequency deviations of 5% while the output frequency remains within 0.25%.

The units come with a two-step audible and visual alarm system that first warns users when utility power is lost and then issues a two-minute warning before battery power is lost.

Other features include input circuit breakers, battery circuit breakers, automatic bypass switch, manual bypass switch, alarm turn-off, reset switch and an internal battery pack with 10 minutes of power.

Options are an RS-232 computer interface terminal, remote alarm interface and remote generator-starting relay.

Isoguard units are rated from 500VA to 10 kVA single-phase and are available in 50Hz and 60Hz versions.

Prices for 60Hz models with a 10-min. full-load internal battery pack range from $1,566 to $19,800.

Isoreg, 410 Great Road, Littleton, Mass. 01460.

■

Sola Electric Co., a unit of General Signal Corp., has announced that it will unwrap a 3-kVA uninterruptible power system (UPS) that uses multiple pulse width modulation.

The UPS is said to operate between the ac line and the load to provide continuous voltage regulation and isolation from noise and transients during normal line power conditions.

Battery reserve is on-line and automatically supplies the load with uninterrupted power, according to the vendor.

A 60-cell lead acid battery pack that provides 22 minutes of reserve power is available as an option.

A transistor-switching pulse width modulation inverter reportedly holds output voltage within 2% despite line voltage fluctuations ranging from 10% to -15%. Other features include two output meters, dc voltameter, primary ac breaker and battery breaker.

The 3-kVA UPS with one battery pack lists for approximately $7,000.

Sola Electric, 1717 Busse Road, Elk Grove Village, Ill. 60007.

■

GTE Control Devices Operation has developed the CP-220 Smoothline, an ac power-surge suppressor for personal computers and telecommunications, video and other electronic equipment.

The unit is said to protect personal computers and peri-

Continued on page 121

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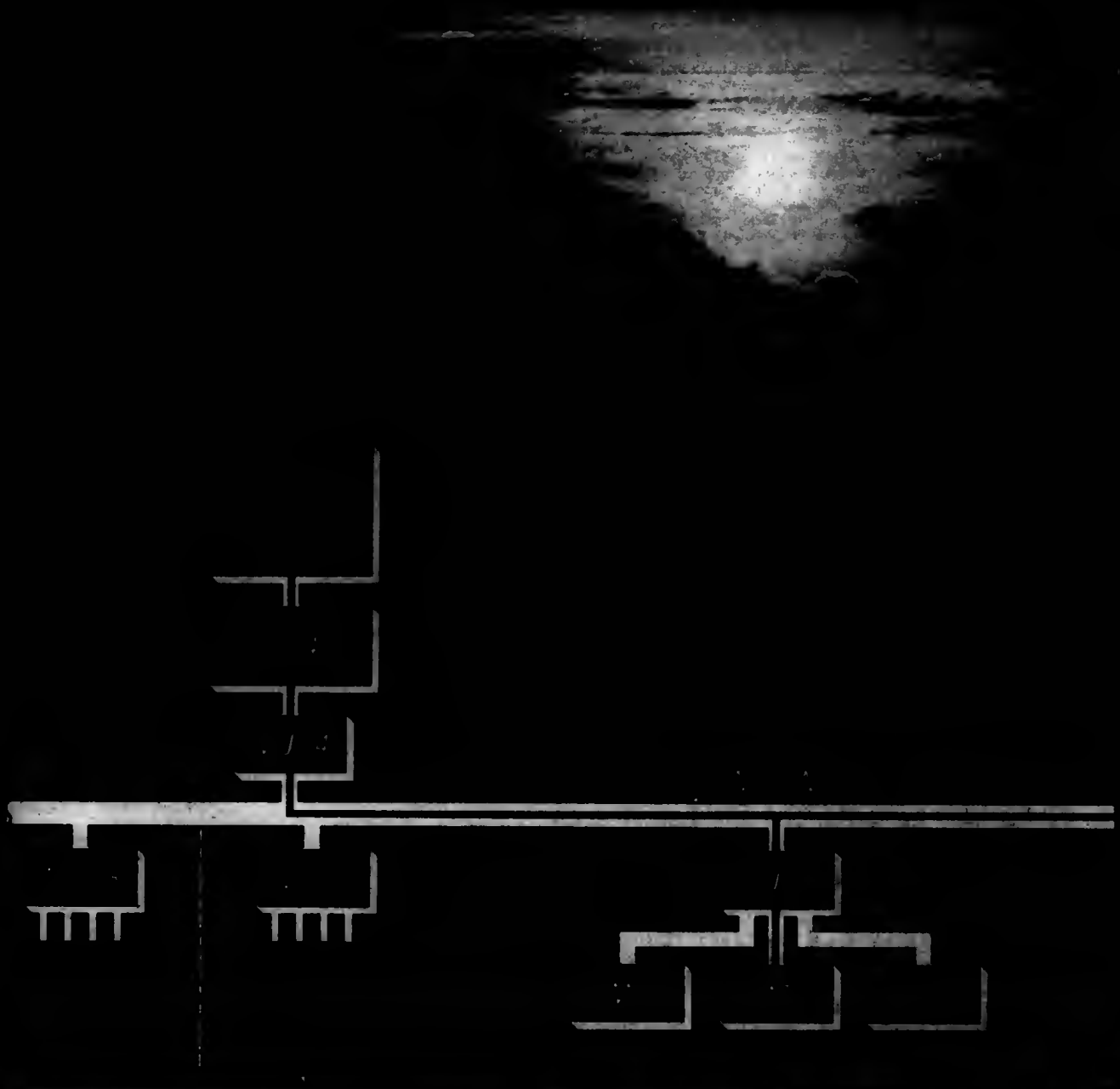

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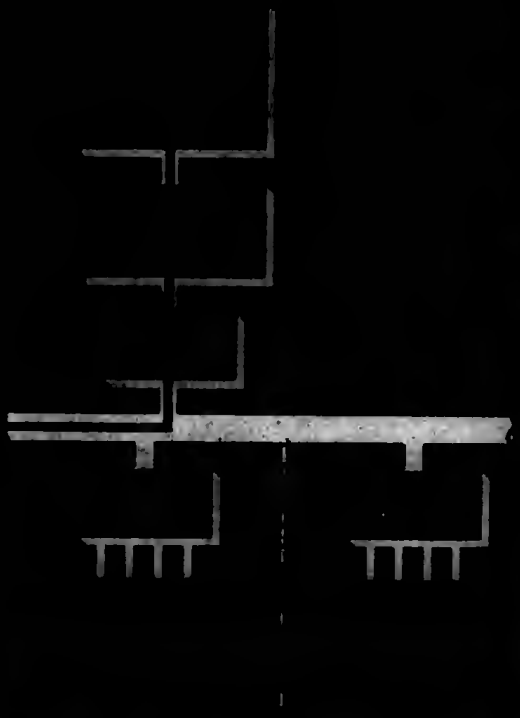

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ITT INTRODUCES THE FASTEST PC IN THE WORLD. BECAUSE TIME IS MONEY.

NEW PRODUCTS

Continued from page 117

phenals from power fluctuations that can cause data loss or equipment damage. It contains four outlets plus an exterior operating switch that lights when operational.

CP-220 Smoothline lists for $69.95.

GTE Control Devices Operation, Rt. 35, Standish, Maine 04084.

■

Control Concepts Corp. has unveiled the **Super Isintrac** series of power-surge protection devices that protects computers and peripherals against power line disturbances caused by transients, spikes and short-term outages.

There are three models: The CP-2 single-outlet unit fills requirements up to 2.5A and is protected by a replaceable fuse. Model CP-7 provides four outlets and is protected by an 8A circuit breaker. The six-outlet CP-15 uses a 15A circuit breaker. The devices actively track input power.

Prices are $69 for the CP-2, $129 for the CP-7 and $199 for the CP-15.

Control Concepts, P.O. Box 1380, 328 Water St., Binghamton, N.Y. 13902.

Board-level devices

EMC Corp. has unwrapped its **HP600 series** of 1M-, 2M- and 4M-byte memory cards for Hewlett-Packard Co. HP 3000 Models 64 and 68 computers.

The HP600 series features on-board error check and correction capability. It can be installed with any combination of EMC- or HP-manufactured cards, the vendor said.

The HP601 costs $7,900, the HP602 costs $14,200 and the HP604 is priced at $25,500.

EMC, 12 Mercer Road, Natick, Mass. 01760.

■

Sierra Semiconductor Corp. has announced **CMOS E2** programmable read-only memory (PROM) multiplexed address and data memory integrated circuits.

The memories are said to include on-board latches and an address decoder, 5V-only programming capabilities and self-timed write and erase cycles. According to the vendor, Sierra's process allows E2 PROM circuits to be combined with analog and digital functions on the same chip.

Prices range from $7.25 to $12.10 each and up to $15.15 each for high-speed versions.

Sierra Semiconductor, 2075 N. Capitol Ave., San Jose, Calif., 95132.

■

Audec Corp. has unwrapped the **Audec SSB-1000**, a voice recognition board that allows voice activation and control of numerous products.

The Audec SSB-1000 can be bought in an evaluation unit for $250. The evaluation board includes a headset with microphone and speaker and an RS-232 interface so that it can be run as a stand-alone unit or with a computer or terminal.

The 5-in. by 5-in. board has a digitizer and a chip set that includes Rockwell International Corp.'s 6500 chip with proprietary software. Boards that recognize 192 words cost $250 (in quantities of one), and one that costs $229 recognizes 78 words, a spokesman said. The chip sets are also available for $119. OEM quantity breaks are available.

Audec, 299 Market St., Saddle Brook, N.J. 07662.

■

Motorola Semiconductor Products, Inc. has introduced the **MVME117 monoboard**, a one-board microcomputer system that can run either stand-alone as a packaged single-board computer or as part of a modular, user-configurable VMEbus computer system.

The MVME117 monoboard includes two serial I/O ports, two parallel I/O ports, a small computer systems interface, a battery-backed real-time clock/calendar, three independent 16-bit timer counters, an interrupt handler, a VMEbus system controller, a VMEbus requester and 128K bytes of dynamic random-access memory. The unit also includes a socket for a Motorola 68881 floating-point coprocessor.

The unit with small computer systems interface costs $2,350. Without the interface, it costs $2,150; and with 512K-byte dynamic random-access memory instead of 128K bytes, it costs $2,575.

Motorola Semiconductor Products, P.O. Box 20912, Phoenix, Ariz. 85036.

■

Performance Interconnect, Inc. has released the **PII-V5000**, a VMEbus-based processor board that uses Motorola, Inc.'s 68020 processor.

The PII-V5000 processor is available with random-access memory in 2M-byte increments up to 8M bytes. The board can address up to 16M bytes of memory via the VMEbus, the vendor said.

The V5000 board provides sockets for Motorola's 68881 floating-point coprocessor and up to 64K bytes of erasable programmable read-only memory.

The V5000 CPU board costs $5,250, and the V5002M 2M-byte memory boards are $3,000.

Performance Interconnect, Suite 2144, 8950 Villa La Jolla Drive, La Jolla, Calif. 92037.

■

Imaging Technology, Inc. has announced the **Series 100**, a family of single-board, plug-compatible image processing modules designed to be

Continued on page 122

Lotus™ on a VAX?

dBASE II on a VAX?
Friday! on a Micro VAX?
Condor on a PDP-11?
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NEW PRODUCTS

Continued from page 121

compatible with Motorola, Inc.'s VMEbus, Intel Corp.'s Multibus, Digital Equipment Corp.'s Q-bus and IBM Personal Computer AT architectures.

The Series 100 modules are capable of digitizing analog video from standard RS-170, RS-330 or 50Hz Consultative Committee on International Radio sources, processing the digital images in real time and displaying the stored image in monochrome or pseudocolor.

The board features a feedback mode for its input look-up tables that allows incoming and stored images to be processed under program control in real time and a memory architecture that allows users to access randomly individual pixels from the onboard frame memory. This allows eight pixels to be moved and manipulated at once.

Other features include a 512- by 512-pixel resolution with 12 bit-plane/pixel, an 8-bit analog-to-digital converter for digitization to 256 levels of grey and the ability to synchronize with video tape recorders.

The Series 100 board is available in monochrome or pseudocolor versions for $3,995 and $4,495, respectively.

Imaging Technology, 600 W. Cummings Park, Woburn, Mass. 01801.

■

Emulex Corp. has announced the SC41 controller for Digital Equipment Corp.'s PDP-11 and VAX-11 Unibus systems that feature mass storage control protocol.

The SC41 provides seek ordering, software transparency, large data buffering, high-performance circuitry and automatic revectoring and error recovery. The SC41 is transparent to the DEC operating systems for PDP-11 and VAX-11 computers.

The SC41 is a single hexadecimal board priced at $4,900.

Emulex, P.O. Box 6725, 3545 Harbor Blvd., Costa Mesa, Calif. 92626.

■

Motorola Semiconductor Products, Inc. has announced a VMEbus-compatible 1,024- by 1,024-pixel memory graphics board set said to provide flicker-free graphics for color and monochrome monitors.

The two-board set can be used for applications requiring either monochrome or red-greed-blue (RGB) color monitors with analog video RS-170 or RS-343A input. Its base board, MVME390-1, can be used alone for handling binary transistor-transistor logic (TTL) monochrome monitors with up to 1,024- by 1,024-pixel resolution, according to the vendor.

There are 384K bytes of display memory dual-ported to the VMEbus and to the display-refresh logic. Memory is organized as three bit-planes of 1,024 by 1,024 pixels simultaneously producing eight colors selected from a palette of 4,096 or eight gray-scale levels selected from a range of 16.

The addressing scheme reportedly allows memory to be accessed from the VMEbus on either a bit-plane or pixel basis.

Prices are $4,500 for the MVME390 two-board graphics set; $2,300 for the MVME390-1 VMEbus graphics display controller module with up to 60Hz refresh rate, monochrome and noninterlace with TTL outputs; and $2,300 for the MVME390-2, the memory expansion for the MVME390-1 that provides two additional 1,024- by 1,024-pixel bit-planes, color palette random-access memory and digital-to-analog converter for RGB RS-343A outputs.

Motorola Semiconductor Products, P.O. Box 20912, Phoenix, Ariz. 85036.

Auxiliary equipment

Raycom Systems, Inc. has unwrapped two cable extender models, the **2300/2302** and the **2320/2322**, which overcome the distance limitations imposed by standard Centronics Data Computer Corp.-compatible parallel printer interfaces.

Model 2300/2302 extends the 10-ft maximum computer-to-printer transmission distance to 3,000 ft, while the Model 2320/2322 increases the distance to a maximum of 500 ft.

Characters input into the Model 2300 at the computer are echoed by the 2302 at the printer transparently to the user. Both models support printer status and control signals.

The 2300/2302 uses fiber optics to provide immunity from static electricity, radio interference and grounding problems. The 2320/2322 uses twisted-pair wiring and an RJ11 modular phone jack connector.

Each cable extender can interconnect minis and personal computers that use a Centronics-compatible parallel interface with Centronics-compatible high-speed line printers.

Prices per pair are $695 for the 2300/2302 and $595 for the 2320/2322.

Raycom Systems, 6395 Gunpark Drive, Boulder, Colo. 80301.

■

Intermec Corp. has released a bar code laser scanner, the **Model 1620**.

The hand-held laser scanner is said to project a concentrated beam of helium-neon laser light to allow the scanner to be held up to 23 in. from a bar code. This feature is said to be useful for inventory control and printed-circuit board scanning.

The 1620 scans low- to high-density bar code at a speed of 36 scan/sec. It can be used with any Intermec laser reader. It can also be used with eight Intermec wand readers when Intermec's 1820 Scan-Mate interface for converting a wand reader into a laser reader is used.

The unit costs $1,395.

Intermec, P.O. Box 360602, 4405 Russell Road, Lynnwood, Wash. 98046.

The Panasonic® Electronic Typing Station. It fills the gap.

The KX-E828 shown with optional second disk drive.

Panasonic knows many of your customers want the benefits of a computer or a word processor, but don't want the often complicated learning process. For those customers, Panasonic offers the perfect solution: the KX-E828 Electronic Typing Station.

All it takes is a basic knowledge of electronic typewriters to take advantage of such features as full-screen text-editing and mail merge. It also includes unlimited disk memory and can check spelling automatically.

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Still, as impressive as the KX-E828 will be to your customers, there is also plenty to impress you. Like Panasonic's famous unparalleled dealer support. Everything from strong co-op programs to national advertising to big profit margins.

For more information on how both you and your customers can quickly profit from the Panasonic KX-E828 Typing Station, call 1-201-348-5394.

Panasonic Industrial Company

COMPUTER INDUSTRY

INDUSTRY INSIGHT
Clinton Wilder
CW Senior Writer

CDLA, IBM: A shaky alliance

Tracking the ever-changing relationship between the Computer Dealers and Lessors Association (CDLA) and IBM has always been a curious business. Theirs is an uneasy symbiosis: the players on each side know that the other is invaluable to their success, but that doesn't mean they have to be happy or fully cooperative in the relationship.

According to a recent International Data Corp. survey, 93% of CDLA members' and other firms' leases in 1984 were written for IBM or primarily IBM hardware. That's even down a tad from 96% in 1983, but the symbiosis is clear. The leasing industry is a huge secondary market for IBM with plenty of bucks — 40% of IBM's U.S. revenue, according to the CDLA — flowing back to Big Blue, while IBM CPUs and, especially, peripherals, are the lifeblood of the leasing industry.

At this point, the feeling of the CDLA toward IBM could best be described as cautiously optimistic. Surrounded by the autumn splendor of the Allegheny Mountains at their semiannual get-together late last month in Hot Springs, Va., CDLA members heard several of their directors report on their recent audience with IBM Chief Executive Officer John Akers in Armonk, N.Y.

That face-to-face meeting was a first for the CDLA, which is a very positive sign. "Akers went around the table and personally thanked each one of us for our business," said CDLA President Harry Goetzmann of CIS Corp. in Syracuse, N.Y. "I can tell you that means a lot."

Goetzmann said all of the leasing industry's hot topics were discussed:

Continued on page 132

Uccel on buying spree

Acquisition strategy steps up development efforts

By John Gallant

Uccel Corp. recently purchased Software Corporation of America (SCA) — a systems software vendor whose 1985 revenue is expected to be more than $6 million — for just under $10 million in cash.

By itself, Uccel's acquisition of Herndon, Va.-based SCA, pales in comparison to the billion-dollar takeover schemes that have come to dominate the financial news of late. But the purchase of SCA marks the ninth such acquisition of a software company by Dallas-based Uccel in slightly more than two years. Since September 1983, Uccel has paid out more than $52 million in cash to purchase a series of small microcomputer, banking applications and systems software firms.

Paul Newton, a senior vice-president, Uccel

Uccel has acquired six of those companies — at a rate of one company a month — since May of this year alone. And, according to Paul Newton, senior vice-president of Uccel's Software Products group, the company intends to continue on its aggressive acquisition campaign. Newton said two significantly larger acquisitions are in the works, one of which will be culminated by year's end.

The strategy behind Uccel's buying spree is simple, Newton said. Uccel's goal is to shift its revenue base so that more than three quarters of its revenue is derived from sales of software. The company is striving to reduce its reliance on revenue from the provision of services, which had been the primary focus of Uccel — known until recently as University Computing Co. — in the past.

In order to meet that goal, Uccel has stepped up its internal development efforts. Earlier this year the company unveiled a reported $20 million development

Continued on page 130

INSIDE

Bell Atlantic won an FCC waiver from Second Computer Inquiry regulations, allowing it to market Centrex hardware and services jointly/**124**

The CDLA will step up its Congressional lobbying efforts by raising political action committee funds/**126**

INSTANT ANALYSIS

"The [leasing] industry is headed for a very stable period, extending perhaps to five years. Conventional wisdom is that we're entering such a five-year cycle with the introduction of the Sierra."

— James F. Benton
Computer Dealers and Lessors Association

BUSINESS NOTES

News from the computer world

The management of Computer & Communications Technology Corp. (CCT) of Santa Barbara, Calif., will take the company private in a leveraged buy-out. The move will be financed by the sale of the management group's remaining 86% stake in CCT subsidiary Zeta Laboratories, Inc. to an undisclosed New York Stock Exchange-listed company. The group is headed by Chairman and Chief Executive Officer E. T. Bahre.

Continued on page 131

TI posts losses, plant closings

By Clinton Wilder

While some leading vendors such as IBM and Digital Equipment Corp. continued to post respectable profits, the recently reported third-quarter results spelled more calamitous news for Texas Instruments, Inc. and Computervision Corp.

Dallas-based TI, decimated by the semiconductor slump and also scarred by the microcomputer downturn, reported a pretax third-quarter loss of $113.7 million and a planned dismissal of 2,200 more employees. The dismissals include the closing of a chip making facility in El Salvador, a wafer processing facility in Houston and a plant in College Station, Texas, where the TI Professional Computer is assembled.

Continued on page 132

Sperry, Altos suffer under industry slump; others gain

By Maura McEnaney

The computer slump continued across a broad spectrum of the industry with recent third-quarter results, led by profit declines from continuing operations at Sperry Corp. and Altos Computer Systems, Inc.

Sperry's sale of its farm equipment operations resulted in a net loss of $187.9 million for the New York-based mainframe manufacturer during the second quarter ended Sept. 30, Sperry said. Profits from its continuing operations were $42.7 million, or 75 cents per share, compared with $97.3 million the year before. Sperry also reported a $230 million loss on discontinued operations from the sale of the farm equipment unit.

Multiuser microcomputer maker Altos Computer Systems of San Jose, Calif., announced a first-quarter sales dip to $31.7 million, compared with $33.5 million during the first quarter a year ago. Net income was $2.3 million, compared with $3.8 million a year ago. Earnings were 16 cents a share, compared with 25 cents a share a year ago.

Other firms reporting results recently include the following:

■ **Miniscribe Corp.** The Longmont, Colo., disk drive manufacturer recorded its first quarterly profit since a new management team took the reins last spring. Third-quarter sales were $28.5 million, compared with $26.1 million for the same period a year ago. Net income for the third quarter ended Sept. 29 was $329,000, compared with a loss of $2.5 million, or 13 cents per share, in the like period a year ago. For the first nine months of the year, Miniscribe recorded a net loss of $19.2 million on sales of $78.3 million.

■ **Electronic Data Systems Corp.** Several new contracts, among them a 10-year systems integration contract with the U.S. Department of Agriculture, contributed to the 151% increase in net income for the Dallas-based computer services company in the third quarter. The company recorded income of $51.9 million, up from $20.7 million a year ago. Quarterly revenue increased 286% to $921.8 million, with General Motors Corp. revenue accounting for $668.7 million of this amount. Nine-month revenue increased 255% from year-ago totals to $2.36 billion. GM revenue accounted for $1.63 billion of this amount.

■ **Mentor Graphics Corp.** Third-quarter sales were $34.3 million, up from $24.2 million a year ago. Net income totaled $1.42 million, or 9 cents a share, compared with $2.35 million, or 17 cents per share, for the third quarter last year. Sales at the computer-aided engineering firm increased 75% from $57.2 million to $100 million during the first nine months of the year.

■ **Convergent Technologies, Inc.** Revenue at the San Jose, Calif.-based systems manufacturer slipped to $101.6 million from year-ago totals of $105.7 million, while earnings climbed from $2.7 million to $3.7 million. Year-to-date revenue hit $295 million, and earnings reached $6.4 million.

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COMPUTER INDUSTRY

Bell Atlantic Centrex deal OK'd

WASHINGTON, D.C. — The Federal Communications Commission recently granted Bell Atlantic Corp.'s request to be the prime contractor of Centrex services and Centrex terminal equipment, provided that the hardware is supplied by an unaffiliated vendor.

The permission constitutes a waiver of FCC rules, which require separation of regulated Centrex service from unregulated telephone equipment, as contained in the Second Computer Inquiry currently under review by the FCC.

Bell Atlantic pledged to the commission that it did not intend to own, install or maintain Centrex terminal equipment.

Bell Atlantic said that 40% of its subscriber lines in Washington, D.C., are Centrex lines and that the U.S. government, its largest user, was demanding a single contractor to supply its telecommunications service. Bell Atlantic said its 1.2 million Centrex lines in the area produce $250 million in revenues.

THE PEOPLE AT ALBERT EINSTEIN ALMOST HAD TO BE EINSTEINS TO ACCESS DATA. UNTIL THEY GOT INTELLECT.

"INTELLECT is the one tool in our Information Center that meets users' expectations about computer technology. It gives them instant English access to a wide variety of information about patients, physicians and more."
—Mr. Hal Augustine, Director, Computer Services, Albert Einstein Medical Center.

The Albert Einstein Medical Center (AEMC) in Philadelphia had 1,000-plus beds, four divisions, 800 admitting physicians, and one major challenge: giving their staff fast, easy access to the databases AEMC maintained.

Clearly, this kind of data retrieval and analysis would be a considerable task for just AEMC's Information Center to handle. The end-users had to become directly involved. So the Albert Einstein Medical Center healed itself by prescribing INTELLECT.

"We wanted a way to make information available to our users in a free-form, non-procedural manner. INTELLECT did it."
—Mr. Paul LoRusso, Vice President, Information Systems, AEMC.

About 30 high-level administrators use INTELLECT's natural language capabilities, including AEMC's President and the General Directors of all four divisions. One Assistant Director says that INTELLECT's immediate response to a series of English questions saved nearly 30 hours of staff work. The Administrative and Fiscal Offices spot and analyze admissions trends, referral sources, and average length of stay. With INTELLECT, you actually type questions such as "What's the average length of stay and average gross charge by discharging physician for DRG 127 (an illness category) during FY85?" and "Compare admissions by admitting diagnosis and principal final diagnosis for Dr. Smith" —and get the answers immediately.

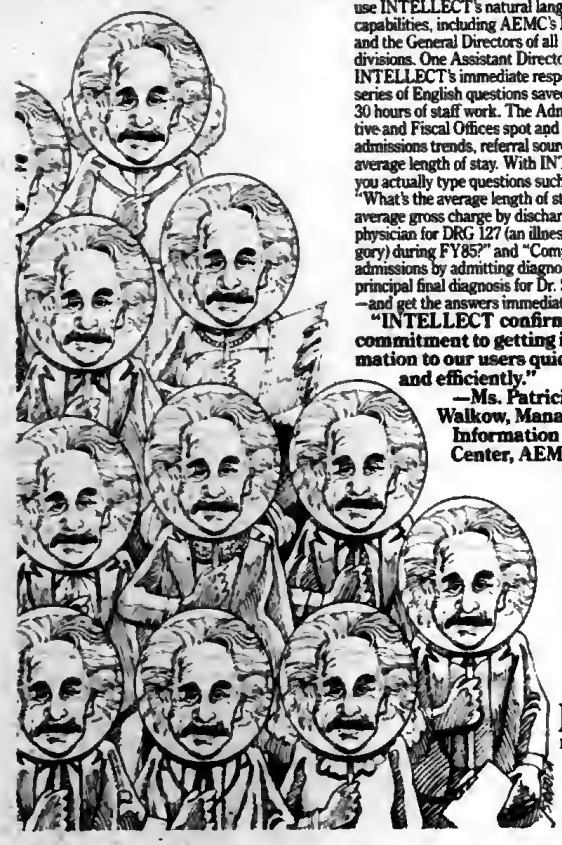
"INTELLECT confirms our commitment to getting information to our users quickly and efficiently."
—Ms. Patricia Walkow, Manager, Information Center, AEMC.

INTELLECT performs so well in giving end-users fast, easy English access to information, AEMC's Information Center plans to develop new applications, including one on hospital personnel. And new INTELLECT/SX (the "personal computing" mainframe version of INTELLECT) will allow even *more* departments to develop their own applications with minimal Information Center involvement—which may end the need for some users to maintain micro-based databases.

"INTELLECT helped us in a way we never expected. It saved 400 hours of software testing by validating that a major new application was producing correct results from our database."
—Mr. Paul LoRusso, Vice President, Information Systems, AEMC.

Consider what INTELLECT has done for AEMC: Administrative staff can now access and analyze patient, physician, insurance, and administrative data for more effective short and long-range planning. Without any technical skills at all.

AEMC proves that INTELLECT is the first software that really makes the computer understand *you*. Find out what INTELLECT can do to make your organization healthier. Write for a free demo diskette. Or for fast action, call us now and ask for Extension #30.



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Wang gets government contract

WASHINGTON, D.C. — The U.S. Department of Health and Human Services has awarded the Federal Systems Division of Wang Laboratories, Inc. a contract valued at up to $14 million for Wang VS computer systems.

Wang was selected through a competitive bidding process to furnish and support computer systems for data processing and office automation over the next five years. The department placed an initial order for $4.4 million, Wang officials said.

Under the terms of the contract, Wang will provide VS computers, terminals, peripherals and communications and software products for the department's headquarters and field offices in 52 cities. The contract also requires Wang to provide training, support and maintenance services.

— Mitch Betts

MERGERS AND ACQUISITIONS

American Express Co. has announced that its wholly owned subsidiary, American Express Travel Related Services Co., has entered into a definitive agreement with **First Data Resources, Inc.** for the acquisition by Travel Related Services of all the shares of First Data Resources' common stock it does not already own at a cash price of $38.25 per share.

■

Gould, Inc. has acquired **International Cybernetics Corp.** The acquisition will be part of Gould's Factory Automation Group. International Cybernetics will continue to operate the firm.

■

Information Science, Inc. and **Cigna Corp.** have reached an agreement in

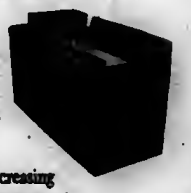
Continued on page 130

Why the three letters you think of first for System/38 add-in memory shouldn't be IBM.™

EMC introduces its 1MB memory expansion card for the System/38.

EMC has just added a feature to add-in memory for IBM's System/38 that's been sorely lacking.

Competition.



Like IBM's 1 Megabyte add-in memory, our new memory expansion card lets you boost the speed and performance of your System/38. Without increasing software or other hardware costs.

But unlike IBM, we let you do it for $2,000 less. (IBM's price is $7,500, ours is just $5,500.)

And our new 1 Megabyte memory uses newer, more reliable technology. It's *so* reliable, there are *no maintenance charges* of any kind.

IBM, on the other hand, charges you a memory maintenance fee of more than $1,000 a year. Every year.

Our memory comes with the industry's only unconditional warranty.

EMC is the first company to ever offer you an *unconditional lifetime warranty* on a System/38 memory card. And we offer the same warranty on every other memory card we make.

[illegible] special toll-free hotline and we'll send you a new card *within 24 hours*—absolutely free.

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We're the name DEC,™ HP, Prime™ and Wang™ users remember first.

EMC is the only independent supplier of memory expansion cards for the System/38.

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You've got to use it.

To let you do that *before* you buy, we've come up with a special trial offer for qualified System/38 owners. Just call or write EMC Corporation at 12 Mercer Road, Natick, MA 01760—and we'll install a "no maintenance" EMC memory board for you without cost or obligation.

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CDLA fund-raising to benefit sympathetic politicians

By Clinton Wilder

HOT SPRINGS, Va. — The Computer Dealers and Lessors Association (CDLA) is charging hard into the political arena.

At its recent annual meeting, the CDLA formally kicked off its political action committee (PAC) fund-raising drive by soliciting pledges from its members. The CDLA hopes to raise $200,000 in PAC money in the coming year to contribute to congressional candidates who support its position on tax and other key issues, according to CDLA President Harry Goetzmann.

"I abhor special interest groups and I personally think [PACs are] not the way to run a country, but I won't get on my soapbox about it and go broke," Goetzmann said in an interview with *Computerworld*. "We're not trying to influence any votes, but we want to get our voice heard."

The CDLA had stepped up its Capitol Hill lobbying efforts in recent months, helping convince the U.S. Department of the Treasury to reduce its proposed "useful life" capital equipment depreciation schedule from eight years to five. The CDLA board told members during the closed business session here that they had decided to oppose a current provision of Rep. Dan Rostenkowski's (D-Ill.) tax proposal that would treat leased equipment less favorably than purchased hardware. The membership supported the position, said CDLA Legislative Committee Chairman Ken Bouldin, president of Memphis-based Econocom-USA, Inc.

Bouldin said the CDLA encourages leasing customers to support the association's political efforts. "I don't think many customers have a hard time recognizing the economic and tax benefits of leasing," he said. "If leasing is not on a level playing field, some of those customer advantages would be eliminated." The CDLA position is also supported by the American Association of Equipment Lessors, a trade group comprising capital goods lessors in the transportation, construction, computer and office equipment industries.

CDLA Vice-President Robert Gulko of Unicom Computer Corp. in Sausalito, Calif., said the CDLA is encouraging members to donate 0.1% of their annual salaries to the PAC.

■

CDLA derails California bill

HOT SPRINGS, Va. — As the Computer Dealers and Lessors Association (CDLA) geared up to fight national political battles with Political Action Committee fund-raising, it was claiming victory in a California political skirmish that its directors claimed to be highly significant.

At its annual closed business session last month, the CDLA told its members of the recent derailing of California Assembly Bill 1507, a consumer protection measure containing major implications for the leasing industry. According to CDLA Vice-President Robert Gulko, the bill would have mandated a six-month warranty period on all computers sold in the state, with a treble-damage provision for violators. But on leased systems priced at $25,000 or more, the manufacturer would have been exempted from the warranty requirements but not the lessor.

"This was a peculiar bill that really scared us a lot," Gulko said. "I think some legislators think of the computer business as one industry and don't understand the distinctions between hardware, software, services and leasing. They think of the computer business only in terms of whatever computer they're looking at on a particular day."

Gulko, who runs a leasing business in Sausalito, Calif., learned of the legislation after it had passed in the California Assembly last July and was sent on to the state Senate. There, CDLA-hired lobbyist Spencer Hathaway helped convince legislators to redraft the bill, which is still pending.

CDLA directors feared that the passage of Assembly Bill 1507 would have set a precedent whereby computer lessors could be at the mercy of lessees for a six-month period without recourse to the vendor. "It would have eliminated any collateral value on a leased computer," Gulko said. "There is not a bank in the country that would lend on a computer as collateral in that situation."

Gulko said the CDLA supports warranty protection legislation that does not threaten lessors. "We understand the personal computer industry; we've all bought software that doesn't work," he said. "But we're saying, 'Let's not throw the baby out with the bath water.' [Consumer protection] is a politically sexy issue that is not going to go away. We want to make sure our voice is heard."

— Clinton Wilder

AT&T seeks second waiver

By Bryan Wilkins

WASHINGTON, D.C. — AT&T, fresh from its recent victory at the Federal Communications Commission, where it was given permission to sell telephone and terminal equipment along with its basic network transmission service, has asked the FCC for similar treatment of its enhanced data communications product lines such as Net 1000.

AT&T said it is requesting the waiver from the FCC requirement to sell enhanced data service through a separate subsidiary, in this case AT&T Information Systems, because it will no longer be able to offer a combined enhanced service/hardware product effectively.

AT&T asked the FCC for expedited treatment of its waiver petition so that it might be able to offer both hardware and enhanced services with its transmission component. The FCC waiver to permit the selling and leasing of customer premises equipment with regulated transmission service is expected to go into effect around Jan. 1.

AT&T said customers of its enhanced data communications equipment, computers that massage data and perform protocol conversion before the data travels over the core network, will be confused because of "evolving regulatory requirements."

The FCC recently opened a new docket, the Third Computer Inquiry, in which it is reviewing the necessity for AT&T's use of a separate subsidiary to sell services when there is no danger of cross-subsidy and threat to competition. In essence, the latest petition asks the FCC for a temporary waiver of the separate subsidiary rules while it proceeds with the Third Computer Inquiry.

If the waiver is approved, AT&T said it will meet specific conditions to provide the enhanced service on an unregulated basis with separate accounting.

Initial public comments are due Nov. 4, and replies are due Nov. 12.

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According to International Data Corporation (IDC), the world's leading information industry research firm, Spain is the sixth largest market in Western Europe with DP expenditures for 1984 at more than $2.7 billion (U.S.) and a projected growth to $5.5 billion (U.S.) by 1989.

Computerworld Espana is the only MIS/DP newspaper in Spain. Each week 8,500 MIS/DP executives turn to *Computerworld Espana* for information on new products and services, current applications and industry trends.

Commodore World, is a monthly publication with a circulation of 22,000. Editorial targets the Commodore user with reports on all aspects of Commodore operations.

PC World addresses the overall Spainish micro market. 12,000 owners and users of Commodore, Hewlett-Packard, Olivetti, Apple, Sinclair, DEC and IBM microcomputers read *PC World* for the latest developments and applications in the micro field.

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Next, we give departments the tools they need to plan and execute winning strategies. It's easy because DPS 6 systems are versatile. So your sales and marketing offices can have just the systems and applications they need while accounting and purchasing have theirs. All able to communicate instantly. Honeywell gives you all this without breaking the bank, because all our systems are designed to provide you with a clear growth path that evolves with your needs.

Finally, Honeywell gives the people in the trenches, the end-users, the friendly kinds of software that make the DPS 6 system easily accessible to everyone.

SERVICE AND SUPPORT

When it comes to service, you'll be backed by Honeywell's worldwide TotalCare™ customer service program that is capable of supporting even intercontinental networks. Uptime, after all, is everything, and TotalCare provides everything you need in programs and services that can be tailored to help meet your requirements.

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Honeywell 100 Years

Together, we can find the answers.

Honeywell

From page 124

Mergers and acquisitions

principle by which Cigna would acquire the assets and certain liabilities of Dyer Wells Associates, a subsidiary of Information Science.

■

Marshall & Swift has announced the acquisition of the assets of the insurance services business of **McGraw-Hill Information Systems Co.** The deal was for an undisclosed cash sum.

■

Westinghouse Electric Corp. and **Lamb Technicon Corp.** have agreed to become equal owners of Mictron, Inc. Mictron had been a Lamb subsidiary.

■

Concept Omega Corp. announced the acquisition of **Science Management Corp.'s (SMC) Software Systems** division. The transaction provides complete rights to Concept Omega of SMC Software Systems' entire Thoroughbred series of Business Basic productivity tools, business applications and a line of educational programs.

■

Gould, Inc. announced that it has completed the cash sale of its **Measurement Systems Division** to Solartron Electronics, Inc., a subsidiary of Schlumberger, Ltd.

From page 123

Uccel embarks on buying spree

project aimed at producing an integrated set of mainframe banking applications. And in June, Uccel announced an ambitious project — dubbed Synova — designed to tie together its line of mainframe systems software.

But internal resources alone are not enough, Newton said. "We had to accelerate the whole process through acquisitions," he said. "We feel that the software market, while it may have its weak spots, is going to be healthy for many years to come. But we cannot benefit from that if we do not reach our goals until the end of the decade."

How does the financial community view Uccel's aggressive approach? "Uccel has been very successful," said Bernie Goldstein, a partner with Broadview Associates, a merger and acquisition firm located in Fort Lee, N.J.

"It has improved its portfolio of products enormously and has become one of the major players in the systems software marketplace. I think the company is successfully moving from a generalist computer services company to a leading systems software company. That has been accomplished largely by the acquisition route," he said.

"Adding software products through acquisition is how major software companies grow," Goldstein added.

Four micro software buys

In the micro software arena, Uccel has purchased four companies: Open Systems, Inc. and Quest, Inc., vendors of financial applications; Spectrum Training Corp., a vendor of computer-based training products; and Micro Development Organization, which Newton said provided Uccel with "new micro development capabilities."

For banking applications, Uccel acquired Financial Software of America, Inc. and Pearl Data Systems, Inc. On the systems software side, Uccel has purchased Barlow Data, a supplier of capacity planning products; Corodale, Inc., which gave Uccel an entry into the IBM DOS/VSE systems software market; and Software Corporation of America (SCA).

The most recent of the acquisitions, that of SCA, gives Uccel five additional systems software products for the IBM MVS market. Those products include a data set performance measurement and analysis tool, a procedure library system and a disaster recovery facility. SCA boasted 1,500 installations of its products and nearly 60 employees. It will operate as part of the Software Products group.

Newton said the acquisitions have barely dented what he called Uccel's "sizable war chest" of cash, but they have stretched management a bit thin. He said the impact of the computer industry slump has accelerated the willingness of smaller software companies to be acquired. It has also allowed Uccel to pick up such companies for perhaps 10% to 20% less than it could have in 1983 or 1984. But the slump has caused Uccel management to ponder the wisdom of its acquisition policy.

"We have asked ourselves, 'Will this be a brilliant strategy because things will be fantastic in the software market again?' or 'Are we going to look stupid because this little glitch is going to turn into a major falling off in the market?' We think the truth is somewhere in between," Newton said.

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From page 123

News from the computer world

CCT also announced it will move its corporate headquarters to San Diego and its recording head manufacturing operations to Tijuana, Mexico. For the third quarter ended Sept. 28, CCT's profits fell to $103,000, or 1 cent per share, from $3.2 million, or 41 cents per share (excluding a one-time benefit), a year ago. Sales dropped from $31.6 million to $20 million.

■

The sell-off of pieces of Mohawk Data Sciences Corp. continued last week with the sale of its UK and Ireland subsidiaries to Dasa Corp., a Stoneham, Mass., vendor of electronic directory dialing systems. The preliminary sale price was $1.4 million in cash.

■

Seymour Merrin, founder, chairman and chief executive officer of Westport, Conn.-based microcomputer retailer Computerworks, Inc., has resigned to join the Gartner Group, Inc. Merrin will be a vice-president and head the Personal Computing Service of the Stamford, Conn., market research firm.

■

Another founder's resignation came at Masstor Systems Corp. in Santa Clara, Calif., where founder and Chairman Erik O. J. Sajbu left to pursue venture capital interests. President David Addison took over the chairman's post.

■

Effective last Friday, Hewlett-Packard Co. consolidated its captive semiconductor operations to work almost exclusively on HP's Spectrum program to develop computers based on reduced instruction set computing technology. The moves are reportedly designed to hasten development of a 32-bit, four million instructions per second microprocessor at the firm's Fort Collins, Colo., integrated circuit division. The newly formed Integrated Circuit Group melds several operations that are not directly related to the Spectrum effort and places them under the Information Systems and Networks Sector.

■

Amidst a storm of bad financial news, Texas Instruments, Inc. received a ray of sunshine recently: Its Japan-based bipolar semiconductor operation became the first completely U.S.-owned company to win Japan's coveted Deming Award for quality control.

■

George Raymond, president of Automatic Business Centers of Moorestown, N.J., was named chairman of the board of the Association of Data Processing Service Organizations, Inc. for 1986. Other officers are Software Design Associates President Jay Goldberg, vice-chairman; and Pansophic Systems, Inc. Vice-Chairman and Chief Executive Officer David Eakra, treasurer.

The four functional vice-presidents for 1986 are Advanced Computer Techniques Corp. President Oscar Schachter, Computer Task Group President Jack Courtney, Electronic Data Systems Corp. counsel P. Michael Nugent and Management Science America, Inc. Chairman and CEO John Imlay.

■

Irwin Rubin is back at the helm of Computer Memories, Inc., the Chatsworth, Calif., disk drive maker that recently lost its contract to supply drives to IBM. Rubin was renamed to his former post as Computer Memories' chairman and chief executive officer, following the resignation of Finis Conner [CW, Oct. 21]. Rubin, 57, had been vice-chairman since Conner took over in September.

■

Britton-Lee, Inc. reported that third-quarter pretax profits fell to $461,000, or 3 cents per share, from $1.5 million, or 11 cents per share, a year ago. Both sets of results exclude extraordinary credits. Revenue increased 12.7% from $6.3 million to $7.1 million.

■

A former Perkin-Elmer Corp. chief financial officer has joined Cauzin Systems, Inc. of Waterbury, Conn., as vice-president and chief financial officer. Michael D. Stashower will control the purse strings of Cauzin's Softstrip System product effort. The system is a data storage method in which information is stored in the form of highly condensed, encoded patterns on paper, which are then scanned by Cauzin's Softstrip Reader and entered into IBM or Apple Computer, Inc. microcomputers.

■

Domestic employment in U.S. electronics firms rose slightly in June, according to a recently released study by the American Electronics Association. However, the 0.4% rise could not offset a 0.8% decline in U.S. electronics jobs for the first six months of the year.

■

Computer Associates International, Inc. reported a 43% rise in profits on a 35% revenue gain compared with the year-earlier period for its second quarter ended Sept. 30. The mainframe and micro software house earned $3.2 million, or 29 cents per share, compared with $2.2 million, or 21 cents per share, in last year's quarter. Sales grew from $31 million to $42 million.

■

Lexidata Corp. has agreed to be acquired by Adage, Inc., its neighbor in Billerica, Mass., and fellow player in the graphics workstation and terminal market. Adage will issue approximately 2.6 million shares of common stock to finance the buy-out, valued at $20 million. The acquisition will merge Adage's end-user orientation with Lexidata's OEM focus in the computer-aided design and manufacturing market. Together, the companies grossed approximately $70 million in revenue in the last fiscal year.

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From page 123

TI posts losses, plant closings

Separately, computer-aided design and manufacturing pioneer Computervision reported a $20.7 million third-quarter loss on a 23% decline in revenue. The Bedford, Mass.-based firm, which has laid off 1,300 workers this year, said it would announce another round of job cuts later this month.

First closings in 10 years

TI's plant closings will be its first in 10 years and bring to 7,000 the number of employees laid off by TI since the beginning of 1985. In addition, none of the company's remaining 80,000 employees worldwide will receive pay raises in the first half of 1986.

The loss included a one-time charge of $63.8 million from the costs of the layoffs and plant closings. After a tax credit, TI posted an $82.8 million loss for the quarter, obliterating a small profit earned in the first six months of 1985. Third-quarter revenue declined 16% to $1.19 billion from $1.42 billion in the year-earlier period.

For the nine-month period, TI lost $77.6 million, including a loss from continuing operations of $4 million. The firm earned $251.5 million in the like period in 1984.

TI is attempting to cut $70 million a year in costs in its computer-related businesses.

Other operations profitable

A spokesman said the diversified firm's defense electronics, metallurgical and electrical controls operations continued to be profitable, and its geophysical services division, which had been hurt by recent declines in the oil industry, operated at a break-even point.

TI's announcement came shortly after United Technologies Corp. announced the scrapping of its Mostek Corp. semiconductor business, which closed a chip plant in Carrollton, Texas, employing 3,200 [CW, Oct. 28]. United Technologies is currently negotiating with Thomson S.A., a diversified French electronics firm, for the sale of the Mostek unit.

Computervision also announced a major corporate centralization, vesting more power in Vice-Chairman and Chief Operating Officer Robert L. Gable.

Gable will take authority over the firm's research and development, marketing and North American sales, international sales, worldwide services and manufacturing operations.

Focus on core target customers

The company will focus its marketing and strategic efforts on its core target customers in fields such as automobiles and aerospace and on its current installed base.

Computervision's third-quarter loss gave it a nine-month setback of $59 million, or $2.05 per share. Revenue dropped 17% in the period to $323.9 million. Third-quarter sales fell 23% to $105.8 million.

Separately, Honeywell, Inc. announced the layoff of 150 workers at its Electro-Optics Division in the Boston suburbs of Lexington, Marlboro, Sudbury and Wilmington.

Some 30 additional jobs will be trimmed by attrition and other measures.

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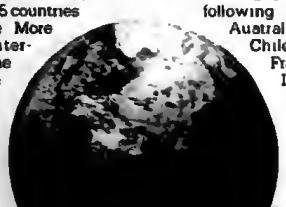

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From page 123

CDLA, IBM: A shaky alliance

the business impact of IBM Credit Corp., the future of the 1956 IBM consent decree and the relationship between the lessors and IBM's service and maintenance arm. While far from agreement on these issues, each side appears to recognize and understand where the other is coming from. For example, IBM isn't making any bones about its efforts to have the consent decree lifted — an effort revealed to the CDLA membership last spring — and the CDLA isn't pretending that it won't mount a tooth-and-nail court fight to prevent the success of that effort.

But in the current atmosphere of relative CDLA-IBM understanding, it was disheartening for both CDLA members and outside observers to hear nothing but party-line puffery in the CDLA meeting's keynote address by Charles Biggar, president of IBM's National Service Division. After an encouraging beginning in which he, too, thanked CDLA members for their business and congratulated them on "the most comprehensive success story in the industry," Biggar launched into a discussion of all the latest technological wizardry that makes IBM's service — in his words — the best in the business.

During a brief question and answer session, Mike Kennedy of Leasing Dynamics Corp. asked Biggar what he had to say about the situation of third-party lessors getting less than full cooperation from IBM field service personnel. Biggar suggested that such incidents were the result of "little people trying to act like executives" and stressed IBM's commitment to timely service response for third-party customers. But in the spirit of Akers opening his door to CDLA representatives, it would have been refreshing for Biggar to address that type of issue head-on in his speech. A standard IBM sales pitch was not the tone that the CDLA members came to hear.

■

How bad is the 1985 computer industry slump? The Association for Computing Machinery (ACM) scheduled its second annual Northeast Regional Conference for last week and mailed out more than 36,000 brochures earlier this year.

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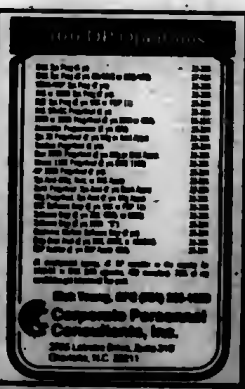

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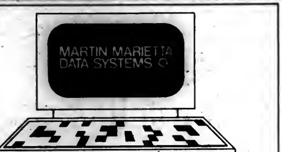

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Computing facilities include the Department's own VAX 8600/785 cluster, AT&T Unix system with dual 385 processors, and HP3000 and IBM S/36 business systems. The Department is also a major user of the IBM3081KX system of the Computer Centre. The office of each academic staff is equipped with an IBM PC compatible workstation, connectable to either the IBM3081 or VAX system.

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RESEARCH INTERESTS

Current research interests include: artificial intelligence, local area networks, software engineering, database management, microcomputer applications, office automation and theoretical computer science. Other areas are being developed. Grants for fundamental and applied research are awarded from the University and other sources.

The present academic staff strength of 50 will be increased to 64 by 1986.

Application forms and further information on terms and conditions of service may be obtained from:

The Director
Personnel Department
National University of Singapore
Kent Ridge
Singapore 0511

Mr. Peter Lim
Director, North America Office
National University of Singapore
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The continued, accelerated growth of our sophisticated computer operations has created key openings for individuals skilled in MIS training and instruction. United maintains a genuine leading edge environment, incorporating hardware and software technologies as they impact the marketplace. The individuals we seek will anticipate and incorporate state-of-the-art technologies into our ongoing Training & Development process.

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Qualified individuals will be responsible for the development and delivery of technical training programs utilizing a wide range of media. Involves development of student and teaching outlines, course materials, testing and evaluation tools, etc. Applicants preferably will have both hands-on experience in computer operations and a communications network as well as in the design and delivery of training programs for these areas. Degree in Education or Instructional Design preferred. Computer-based training and video production experience a definite plus.

These positions are located at our corporate headquarters complex in suburban Chicago. We provide an outstanding compensation package including relocation assistance. Pass/reduced fare air travel privileges provided. Send your resume with salary history in confidence to: Professional Employment/EXOPX-TTD, United Airlines, P.O. Box 66100, Chicago, IL 60666. *Equal Opportunity Employer.*

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602

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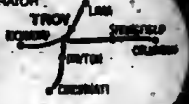

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4331-1	0.25	0.5 to 1
4331-11	0.38	1 to 2
4331-2	0.50	1 to 4
4341-9	0.92	1 to 4
4361-3	0.70	2 to 4
4341-10	0.75	2 to 4
4341-1	0.89	2 to 4
4381-11	1.1	2 to 8
4381-4	1.16	2 to 12
3031	1.2	2 to 8
4381-5	1.45	2 to 12
4341-2	1.5	2 to 16
4341-12	1.65	2 to 16
3031AP	2.0	2 to 6
4381-1	2.1	4 to 16
3032	2.5	2 to 6
4381-2	2.7	4 to 32
3033S	2.9	4 to 16
*3083CX	3.3	6 to 32
*4381-3	4.0	2 to 32
3083E	4.2	8 to 32
3033N	4.3	4 to 16
3083EX	4.4	8 to 32
3033UP	5.0	4 to 24
3083B	6.3	8 to 32
3083BX	6.6	8 to 32
3090J	8.4	9 to 32
3033MP	8.5	8 to 32
3033AP	8.5	4 to 24
3083JX	8.8	8 to 32
3081D	10.8	16 to 32
3081G	11.0	16 to 48
3081GX	11.9	16 to 64
3081K	14.0	16 to 48
3081KX	15.6	16 to 64
3090S	20.6	32 to 96
3084QX	28.7	32 to 128
†3090-200	29.4	64 to 192
†3090-400	52.6	128 to 384

*First installation 1984 †First installation 1987

AMDAHL

SYSTEMS	MIPS	MEGABYTES
470V 7A	4.8	8 to 28
470V/7	6.5	8 to 32
470V 8	8.5	8 to 32
5840	8.8	16 to 64
5850	11.8	16 to 64
5860	14.6	16 to 64
5867	22.0	24 to 64
5868	32.0	32 to 128
5870	32.6	16 to 64
5880	26.6	32 to 128

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SYSTEMS	MIPS	MEGABYTES
AS 8043	5.2	6 to 32
AS 8053	6.5	6 to 32
AS 8063	8.4	16 to 32
AS 9040	7.2	6 to 48
AS 9050	9	6 to 48
AS 9060	11.2	16 to 64
AS 9070	16.2	16 to 64
AS 9080	20	16 to 64
†AS XL 60	28	32 to 256
†AS XL 80	40	64 to 256

†First installation 1986

The above information is intended as a guideline for computer users on relative computer system instruction cycle times. All data have been derived from published documentation and represent reasonable estimates of average MIPS ratings. However, Randolph is not responsible for the accuracy of the MIPS data. Cycle times will vary based on hardware/software configurations, and system manufacturers continually modify computer models as design improvements in hardware and software arise.

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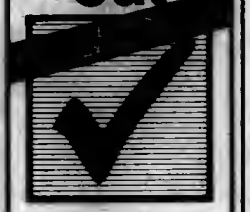

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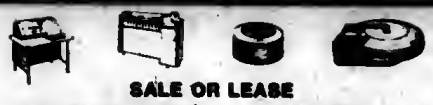

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Melvyn Bennett, Regional Sales Mgr., Asia Computerworld Pte. Ltd., 2023 Swire House, 9 Connaught Rd. Central, Hong Kong. Phone: 210395. Telex: (780) 72827 HX COMWR.

Spain: Neil Kelly, Computerworld/Espana, Barquillo 21, Madrid 4. Phone: 231-23-85; 231-23-86; 231-23-88. Telex: 47894(CW E).

Sweden: Bengt Mamfeldt, Nova Media AB Sodra Hamnvagen 22, S-115-41 Stockholm. Phone: 46-8-67-91-80. Telex: 14904 NOVACW.

The Netherlands: Johannes A. Witvoet, Mgr. Dir., Computerworld Benelux, Van Eeghenstraat 84, 1071 GK Amsterdam. Phone: 020-646426. Telex: (844) 18242.

Venezuela: Kalman Von Vajna Nagy, CW Communicaciones CRL Torre Maracaibo, piso 13, Oficina H, AV. Libertador, Caracas. Phone: 72-76-30.

West Germany: Eckhard Utpadel, CW Publikationens, Friedrichstrasse 31, 8000 Munich 40. Phone: (089) 38172-0. Telex: 5215350.

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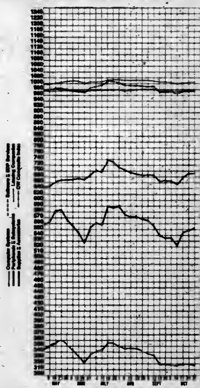

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CLOSING PRICES WEDNESDAY, OCTOBER 30, 1985

EXCH	COMPANY	1985 RANGE (1)	CLOSE OCT 30 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS				
[illegible]	ALPHA MICROSYSTEMS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ALTOS COMPUTER SYST	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	AMDAHL CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	APPLE COMPUTER INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	BURROUGHS CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPAQ COMPUTER CO	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER AUTOMATION	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER CONSOLES	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CONTROL DATA CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CONVERGENT TECHNOL	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CPT CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CRAY RESEARCH INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DAISY SYSTEMS CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATA GENERAL CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATAPOINT CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DIGITAL EQUIPMENT	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ELECTRONIC ASSOC.	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	FLOATING POINT SYST	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	GOULD INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	HEWLETT-PACKARD CO	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	HONEYWELL INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	IBM	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	IPL SYSTEMS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ITT CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	M/A-COM INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MANAGEMENT ASSIST	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MATSUSHITA ELECTRIC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MODULAR COMPUTER SYS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MOHAWK DATA SCI	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MOTOROLA INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	NAT'L SEMICONDUCTOR	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	NBI INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	NCR	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PERKIN-ELMER	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SPERRY CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TANDEM COMPUTERS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TANDY CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TELEVIDEO SYSTEMS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TEXAS INSTRUMENTS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ULTIMATE CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	VECTOR GRAPHICS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	WANG LABS "B"	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	WANG LABS "C"	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	XEROX CORP	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	COMDISCO INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CONTINENTAL INFO SYS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PHOENIX AMERICAN INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SELECTERM INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	U.S. LEASING	[illegible]	[illegible]	[illegible]	[illegible]
	COMPONENTS				
[illegible]	ADVANCED MICRO DEV	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ANALOG DEVICES INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ANALOGIC CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	APPLIED MAGNETICS CO	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	MICRO MASK INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TERADYNE	[illegible]	[illegible]	[illegible]	[illegible]

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(1) TO NEAREST DOLLAR

EXCH	COMPANY	1985 RANGE (1)	CLOSE OCT 30 1985	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & EDP SERVICES				
[illegible]	ADVANCED COMP TECH	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ADVANCED SYSTEMS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	AGS COMPUTERS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	AMERICAN SOFTWARE	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ANACOMP INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ANALYSTS INTL CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	APPLIED DATA RES	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ASHTON TATE	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ASK COMPUTER SYSTEMS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	AUTOMATIC DATA PROC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER HORIZONS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER NETWORK	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	COMPUTER TASK GROUP	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	REYNOLDS & REYNOLDS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SEI CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SHARED MEDICAL SYST	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SCIENTIFIC COMPUTERS	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	UCCEL	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	AM INTERNATIONAL	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	ANDERSON JACOBSON	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CANON? CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CENTRONICS DATA COMP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	CETEC CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

EXCH	COMPANY	1985 RANGE (1)	CLOSE OCT 30 1985	WEEK NET CHNGE	WEEK PCT CHNGE
[illegible]	COMPUGRAPHIC CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTER TRANSCEIVER	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	COMPUTERVISION CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DATAPRODUCTS CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	EVANS & SUTHERLAND	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	HAZELTINE CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	INFORMATION INTL INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	INTERMEC INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	INTEL CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	LUNDY ELECTRONICS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	NETWORK SYSTEMS CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	NO AMERICAN PHILIPS	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	NORTHERN TELECOM LTD	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PLESSEY CO (ADR)	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	PRINTRONIX INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	RECOGNITION EQUIP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SCAN-TRON CORP	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SCIENTIFIC ATLANTA	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	SEAGATE TECHNOLOGY	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	STORAGE TECHNOLOGY	[illegible]	[illegible]	[illegible]	[illegible]
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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TAB PRODUCTS CO	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TEKTRONIX INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TELEX	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	TIMEPLEX INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	VISUAL TECHNOLOGY	[illegible]	[illegible]	[illegible]	[illegible]
	SUPPLIES & ACCESSORIES				
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	DUPLEX PRODUCTS INC	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	3M COMPANY	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	STANDARD REGISTER	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	WALLACE CORP SERVICE	[illegible]	[illegible]	[illegible]	[illegible]

A few smart reasons to buy our smart modem:

Features	Ven-Tel 1200 PLUS	Hayes
1200 and 300 baud, auto-dial, auto-answer	Yes	Yes
Compatible with "AT" command set	Yes	Yes
Can be used with CROSSTALK-XVI or Smartcom II software	Yes	Yes
Regulated DC power pack for cool, reliable operation	Yes	**No**
Eight indicator lights to display modem status	Yes	Yes
Speaker to monitor call progress	Yes	Yes
Attractive, compact aluminum case	Yes	Yes
Two built-in phone connectors	Yes	**No**
Compatible with The Source and Dow Jones News Retrieval	Yes	Yes
Unattended remote test capability	Yes	**No**
Phone cable included	Yes	Yes
Availability	Now	
Price	**$499**	**$599**

The Ven-Tel 1200 PLUS offers high speed, reliable telecommunications for your personal computer or terminal. Whether you use information services or transfer data from computer to computer, the Ven-Tel 1200 PLUS is the best product around. Available at leading computer dealers and distributors nationwide.

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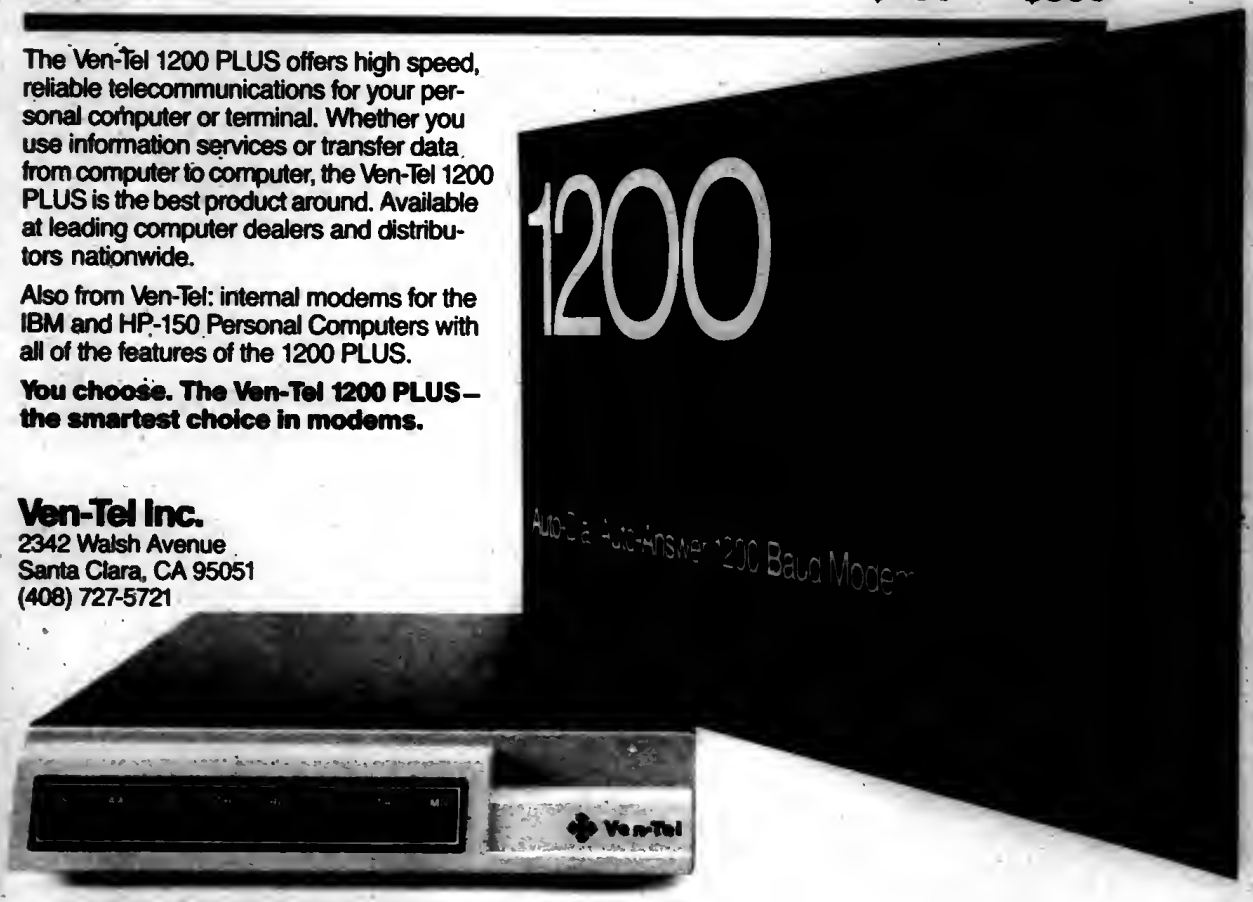

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